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ABSTRACT

A thorough study of changing student transportation patterns is justified on the grounds that (1) campuses are major traffic generators; (2) there is increased concern over the need to develop transportation systems that pose less ecological threat to the urban environment; (3) transportation patterns of students, faculty, and staff are changing and planning for the future requires an analysis of the changes. This study analyzes all significant changes in student transportation patterns at the University of California during the period 1965-66 to 1971-72. The study was initiated in 1972 when the number of bicyclists appeared to be rapidly increasing at several of the nine University campuses. The campuses were classified by their dominant student transportation orientation: pedestrian (San Francisco and Berkeley); bicycling (Davis and Santa Barbara); automobile (Irvine, Los Angeles, Riverside, and San Diego); and auto-public transportation (Santa Cruz). The factors shaping student transportation patterns are discussed including proximity and concentration of student housing; availability and quality of alternative transportation modes; scale and intensity of environs development; topography of campus and environs; and campus and community transportation policies. (Author/JMF)

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TO AND FROM CAMPUS:
CHANGING STUDENT TRANSPORTATION PATTERNS

Ira Stephen Fink

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TO AND FROM CAMPUS:
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FOREWORD

Traffic generation has been a persistent concern of campus planners and city officials in communities containing institutions of higher education. With time, this concern has become more important.

One report studying parking needs in university communities has observed that traffic generation and use of automobiles by students has created even more of a problem in university districts than in the central business districts of large cities. The report states:

> Whereas the use of automobiles by the university faculty and staff has probably grown in about the same proportion as by other types of employed persons, student reliance on the automobile has swept far beyond the predictions of campus planners. On many campuses more than half the students either own or have the use of automobiles....The automobile is no longer considered a luxury by many students, but a necessity.[1]

Further evidence of the importance of campus traffic problems is offered in a recent study in campus-community relations by the International City Managers' Association. Their study, based on a survey conducted in summer 1971 in seventy-eight cities with institutions of higher education, revealed that of twelve college-related problems, "traffic and parking automobile-related problems rank one and two respectively, and are the only college-community problems reported as existing in sixty percent or more of surveyed communities."[2] By contrast, the next most important problems--housing and drug abuse--were reported as critical by only half of the respondents in their study.

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[1] V. Setty Pendakur, "Access, Parking and Cost Criteria for Urban Universities," Traffic Quarterly, Volume 22, Number 3. (July 1968). p. 360.

The study by the City Managers Association further notes that traffic and parking problems "are particularly interesting for they give every indication of getting worse before they finally get better." This is happening, the study argues, because of the increasing number of students who are moving to off-campus housing; the result has been an apartment house building boom in communities with large colleges or universities and corresponding increase in vehicular traffic as more students join the ranks of commuters to campus."

One further finding by the City Managers Association, particularly relevant for University of California campuses which are planned to become sizeable institutions, was that the presence of traffic and parking problems was highly correlated with large institutions; "traffic difficulties were mentioned by ninety-one percent of the cities which contained colleges with enrollments of over 12,000 students, but only by twenty-three percent of those with enrollments of 2,500 or under."

In summary, a thorough study of changing student transportation patterns is justified at this time on several grounds. First, campuses are major traffic generators in their communities and traffic-related problems are major issues between campuses and their communities.

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[2] James V. Banovetz, David R. Beam and W. John Pembroke, "College and Community Relations," The Municipal Yearbook: 1972 (Washington, D. C.: International City Management Association, 1972).

Second, citizens in the campus environs (and everywhere else) are voicing increasing concern over the need to develop transportation systems which pose less ecological threat to the urban environment. It seems only fitting for campuses to acknowledge this concern and work with their communities to make more environmentally-oriented transportation systems a reality.

Third, partly as a consequence of an increased environmental awareness, the transportation patterns of students, faculty, and staff are changing. To plan for future campus transportation and circulation systems it is necessary to know about present systems and, if suitable, support and encourage changes in transportation modes. For example, the recent shift at some University of California campuses from use of cars to use of bicycles, if continued, can, in the long run, be financially attractive by saving space and money which would otherwise be needed for extensive automobile parking lots and roads.

This study analyzes all significant changes in student transportation patterns at the University of California during the period, 1965-66 to 1971-72. The report is one of a series of papers prepared by this office and concerned with the social, economic, and physical effect of the University campuses on their adjacent communities.

The staff work for this report was prepared in the Office of the Assistant Vice President--Physical Planning by Mr. Ira Fink and Ms. Joan Cooke--Ms. Cooke completed some of the initial drafts. Student assistance was provided by Ms. Kathy Wegener who assembled much of the data and Ms. Vicki Schulkin who assisted in the editing. Campus and community planners at the various campuses of the University reviewed and commented upon drafts of the chapters. The typing of the report was under the direction of Ms. Theresa Coombs and Ms. Elena Zekos.

Ira Stephen Fink
University Community Planner

NOTE

This study does not suggest transportation plans for campuses or propose physical changes to accommodate different transportation modes. It deals solely with past student transportation patterns at the University of California--conditions which helped to create the patterns, and policies that have been initiated to change them. It is based upon data collected during the years 1965-66 to 1971-72.

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I. THE NEED FOR BALANCED TRANSPORTATION

Many have criticized the tyranny of the automobile and have proposed the development of balanced and diversified transportation systems that would more satisfactorily suit contemporary needs. What is not always clear, however, is what sort of transportation system is to be substituted for the automobile. The circulation section of the City of Berkeley Master Plan suggests that we should:

> Reduce the dependence on the private automobile as the dominant mode of transportation by developing a fully integrated system of pedestrian, bicycle, local transit, regional transit, and automobile facilities....[1]

George Wickstrom, Deputy Director of the Department of Transportation Planning for the Metropolitan Washington Council of Government, writes that balanced transportation:

> ...is that mix of transportation modes which provide facilities and services offering a desirable level of access to opportunities to residents of an urban area...it provides these opportunities in accordance with individual needs at the lowest possible cost, considering social, environmental and transportation factors.[2]

---

[1] Berkeley Master Plan. Berkeley, California: City Planning Commission, amended to August 1968. p. 45.

[2] George Wickstrom, "Defining Balanced Transportation - A Question of Opportunity," Traffic Quarterly, Volume 25, Number 3 (July 1971). p. 346.

According to the study, Balanced Transportation Planning for Suburban and Academic Communities, the term "balance" also implies a trade-off or compromise. The authors state: "The basic objective of a balanced transportation plan should therefore be to achieve an equilibrium point, at which advantages for the population as a whole are maximized and disadvantages minimized."[3] However, they indicate, achieving a balance is complicated by two considerations: first, geographic, political or economic factors may constitute constraints which limit the flexibility of planning; second, for technological or other reasons, there may be a "step function" involved in implementation of transportation plans (e.g., extending a rapid transit route system is far more expensive than buying one or two new buses for a new bus route).

The authors of the Balanced Transportation study therefore suggest the following as positive characteristics of a transportation network which would seem desirable to maximize:

- Mobility for all members of the population.
- Conservation of human and natural resources.
- Efficiency in the transportation of people and goods.
- Efficiency and economy in the use of public funds.
- Convenience, comfort, safety and reliability.

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[3] Balanced Transportation Planning for Suburban and Academic Communities: A Case Study of the Midpeninsula Region of the San Francisco Bay Area. Final Report of the Stanford (University) Workshop on Transportation Planning. Edited by Christopher H. Lovelock. Stanford, California: Stanford Workshops on Political and Social Issues (SWOPSI), 590A Old Union, Revised December 1971, p. 1.3.

- Accessibility of locations, especially of those offering employment or educational opportunities.
- Pleasing design of facilities and emphasis on aesthetic considerations.

They find the following negative aspects of transportation systems are often just the reverse and seek to minimize them:

- Financial costs to the individual.
- Financial costs to the city, county, state and Federal Government.
- Congestion and waste of personal time.
- Damage of physical and mental well-being of individuals.
- Air, noise and water pollution.
- Rate of exploitation of natural resources.
- Destruction or division of neighborhoods.
- Wasteful land use and destruction of the tax base.

One assumption underlying this present study is that university planners have a responsibility to work with their communities to develop more satisfactory and balanced transportation systems for two reasons: first, because campuses are major traffic generators in their communities, and, second, because institutions are in the position to change their campus transportation systems.

As this report recognizes, and as the Balanced Transportation report states:

> A very important consideration to keep in mind is that what may be best for the individual may not necessarily be best for society as a whole. For a single citizen, the most satisfactory form of travel (if he can afford one and is able to drive it) is almost certainly a private car. When the number of car drivers is multiplied many thousand-fold, however, significant congestion and pollution may make this form of travel less than satisfactory for the community as a whole and even for the individual. The same is true of many other activities: there is a critical point at which a particular course of action ceases to be efficient, and/or begins to generate an undesirable level of side effects (or 'diseconomies')....Conversely, there are certain facilities which can only be implemented on a very large scale before they become economic. Transportation planning deals with individual needs, although these are often expressed in terms of substantial groups of people with similar if not identical requirements. But in seeking to satisfy these needs, constant reference must also be made to the consequences for society as a whole.[4]

A balanced transportation system must then, as a minimum, serve two needs of the campus-community: first, the system must provide students, faculty, staff and others using campus facilities with acceptable means to get to and from campus; and, second, the transportation system must provide access to non-university related activities and services--trips for work, shopping, entertainment, and recreation.

While the rationale for providing convenient access *to and from the campus* has been a traditional concern of campus/community planning, the second concern, the need for access *to and from the entire urban area*, especially by students, may seem at first glance beyond the scope of university planning--but it is not.

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[4] *Balanced Transportation*, *ibid.*, pp. 1.3 and 1.4.

At many of the nine campuses of the University of California, particularly at the mature campuses (Berkeley, Los Angeles, San Francisco) with developed environs housing markets, students are gradually moving further away from campus. Some experts in higher education now argue that the university educational experience is changing, with students becoming increasingly involved in a network of other kinds of relationships. Hence, college education in an urban area is becoming "something less central, less engrossing, and less of a discernible life cycle stage."

Students are locating farther from campus because of the need to be conveniently situated in relation to a number of involvements--employment, non-academic interests, and recreation. Also, to the extent that students are experimenting with different life styles, they may also feel a need to be away from the sense of the establishment suggested by the University's site and presence.

The need for greater accessibility by students to a variety of urban activities and the movement away from campus suggests that, as a goal, campus/community transportation systems should increase accessibility and mobility to all parts of the community. Unfortunately, the survey data collected from University of California students for this study does not provide adequate information on the magnitude of these off-campus transporation patterns and needs, although it is clear that as urban life becomes more complex, and the need for accessibility to more diverse activities increases,[5] that the need for more adequate transportation and circulation facilities to and from campus similarly increases.

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[5] The report entitled, Southside Student Housing: Preliminary Environmental Study, prepared by Gruen Gruen + Associates for the University of California, Berkeley (March 1974) indicates on page 96 that of 57 daily trips reported by 35 respondents (average of 1.6 daily trips each), 42% of the trips were to campus, 9% to work, 28% to convenience shopping, 2% to major shopping, 2% for recreation and dining, and 17% for other purposes.

Nonetheless, this report does provide some new insights into the interdependency of student travel modes and housing location, and the relationship between student use of the campus and non-campus activities. It therefore should be useful to campus planners at all nine University of California campuses, and to community planners, citizens and city officials in these campus environs as changes in these interdependent activities are spelled out. It should also be helpful in promoting the development of balanced transportation systems which take into account contemporary environmental concerns and changing student travel modes.

Although the report is not intended to be a policy recommending document, it is possible to list a series of several policy recommendations that might lead to a balanced transportation system. These several recommendations, extracted almost verbatim from a larger list contained in the Balanced Transportation[6] study are summarized in Appendix A. The University of Washington Transportation Policy, adopted by their Board of Regents on September 28, 1973, is contained in Appendix B.

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[6] Balanced Transportation, op. cit., pp. 4.16 to 4.28.

II. BACKGROUND

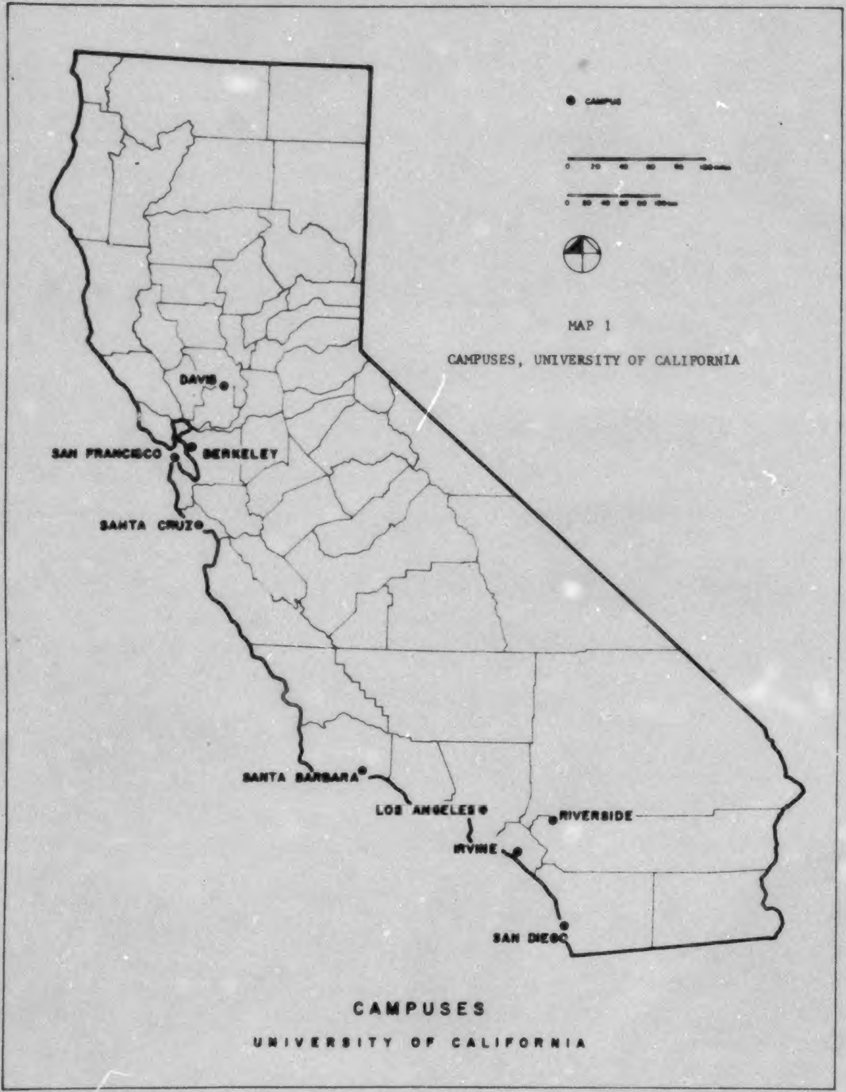
A. STUDY PURPOSE

This study was initiated in 1972 by the Community Planning Section of the University of California, Office of the President, because of the observation that the number of students riding bicycles to campus appeared to be rapidly increasing at several of the nine University campuses. (The campus locations are shown in Map 1.) The appearance of a large number of bicycles suggested a solution to the problems of increasing traffic congestion at the campuses.

Accordingly, available campus statistics on students' modes of transportation to campus and vehicle ownership collected by the Office of the President from 1965-66 to 1971-72 were studied; no new studies were undertaken. The existing data confirmed that bicycle use and ownership were increasing at nearly every campus.

The question then arose that if bicycling was becoming more popular, what form or forms of transportation was it replacing? For example, it was of special interest to know if fewer students were driving cars to campus.

As a result of these interests, this study was expanded to analyze all significant changes in student transportation patterns during the period 1965-66 to 1971-72 insofar as they could be observed from collected data. In expanding the scope of the study, it was discovered that the nine University of California campuses differed markedly in the popularity of student transportation modes; yet, for study purposes, a typology of the campuses could allow them to be classified by their dominant


CAMPUS
DAVIS
SAN FRANCISCO
BERKELEY
SANTA CRUZ
SANTA BARBARA
LOS ANGELES
RIVERSIDE
IRVINE
SAN DIEGO
CAMPUSES
UNIVERSITY OF CALIFORNIA

MAP 1

CAMPUSES, UNIVERSITY OF CALIFORNIA

student transportation orientation: Berkeley and San Francisco were pedestrian campuses; Davis and Santa Barbara were bicycling campuses; Irvine, Los Angeles, Riverside, and San Diego were automobile campuses; Santa Cruz was auto-public transportation campus.

B. CAMPUS TRANSPORTATION ORIENTATIONS

To establish the typology of a campus transportation orientation, dominant transportation modes were identified for each University of California campus. In so doing, all campuses, except Santa Cruz, had a mode of transportation used by approximately one-half or more of the student population in the 1971-72 academic year.

For example, Berkeley and San Francisco were classified as pedestrian-oriented campuses because in 1971-72, 49% of Berkeley students and 51% of San Francisco students walked to campus; Davis and Santa Barbara were bicycle-oriented campuses because 64% of Davis' students and 58% of Santa Barbara's students bicycled to campus; Los Angeles and Riverside were moderately automobile-oriented campuses because 57% of Los Angeles' students and 55% of Riverside's students used cars to travel to campus; Irvine and San Diego were heavily automobile-oriented campuses because 81% of Irvine's students and 72% of San Diego's students used cars to travel to campus. Finally, Santa Cruz was classified an automobile/public transit-oriented campus because 28% of its students used cars, while 36% of its students used public transit to travel to campus.

In order to learn more about the transportation patterns at each campus, background material on the planning, land use, and other relevant characteristics of each campus environs were studied, previous transportation reports were read, and interviews were held with each campus planner (or his equivalent). Through these interviews it was discovered that campuses which shared similar transportation orientations also shared other common campus and community characteristics as well.

Furthermore, the interviews revealed that in a number of cases deliberate transportation policy decisions had been made on campus to encourage or discourage a particular transportation mode. When student transportation policy decisions had been designed to alter the student transportation orientation, they were explored and are reported in this study.

Finally, to place the University of California's student transportation systems in perspective with systems at other campuses, transportation patterns of other institutions and policies designed to affect these transportation patterns were also reviewed.

C. ORGANIZATION OF THE REPORT

This report presents information acquired through the study process outlined above; little of the data has been previously published.

The previous chapter reports on the theory of balanced transportation. This background chapter contains sections on the purpose and organization of this study. Some of the short-comings and some of the problems encountered in the data analysis are contained in the following Chapter III on methodology.

Chapter IV describes those factors which are most influential in shaping student transportation patterns at all campuses, while Chapter V contains the major conclusions derived from the study with individual campus transportation orientations as the focus.

Chapter VI summarizes, for the period 1965-66 to 1971-72, the changes in travel modes and vehicle ownership rates on a University-wide basis for all nine University of California campuses considered together and also provides some comparison of changes at each individual campus.

Chapters VII through XV describe student transportation modes with a separate chapter on each University of California campus within the context of the campus' major student transportation orientation as follows: Chapter VII, pedestrian--Berkeley; Chapter VIII, bicycle--Davis; Chapter IX, automobile--Irvine, Chapter X, automobile--Los Angeles; Chapter XI, automobile--Riverside; Chapter XII, automobile--San Diego; Chapter XIII, pedestrian--San Francisco; and Chapter XV, auto-public transit--Santa Cruz.

At the beginning of each campus chapter is a summary of campus transporation. This is followed by a background section on how both the environs and campus transportation policy affects students' propensity to use alternative transportation modes. Next, is a discussion of that campus' student transportation modes as they existed in 1971-72 and an analysis of how student transportation modes and vehicle ownership patterns have changed since 1965-66. Each of these chapters also examines student vehicle ownership in relationship to vehicle use--that is the extent (and the probability) that students at campuses with differing transportation orientations use the vehicles they keep.

Where relevant, campus transportation data are analyzed according to the distance of student residence from campus. This analysis can be used as a tool to guide campus planners in estimating the probable traffic generation of additional student housing located at different distances from campus. The data can also be used to determine off-street parking needs of student-oriented housing constructed at differing distances from campus.

III. METHODOLOGY

A. DATA SOURCES

The statistical findings contained in this report are based on data obtained from Student Housing and Transportation Surveys undertaken by the Office of the President on all nine University of California campuses annually since 1965-66. The surveys are distributed in each student's registration packet in the winter quarter of each year with a general response rate of approximately 90% of all University students.

The survey form contains fourteen questions in four basic categories: (1) personal information about the student--academic standing, marital status, sex; (2) housing characteristics--type of housing, monthly rent, distance of housing from campus; (3) transportation characteristics--transportation mode most often used to and from campus and vehicle kept at campus residence; and (4) miscellaneous items, such as annual cost of room and board, location of home of parents or relatives, and so on. A copy of the survey cards used at three campuses in the Winter Quarter 1972 is shown on the next page.[1]

This present study focuses on the two transportation questions contained in the Student Housing and Transportation Survey: transportation mode and vehicle kept at student residence. Data on the student's transportation mode, taken from the question "transportation most often used to and from campus" is cross-tabulated with "distance of student residence

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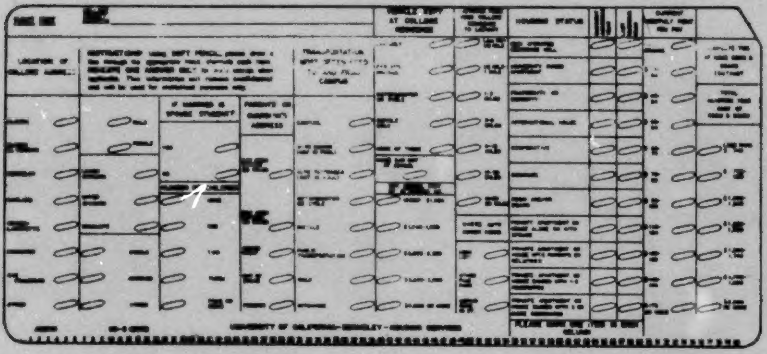
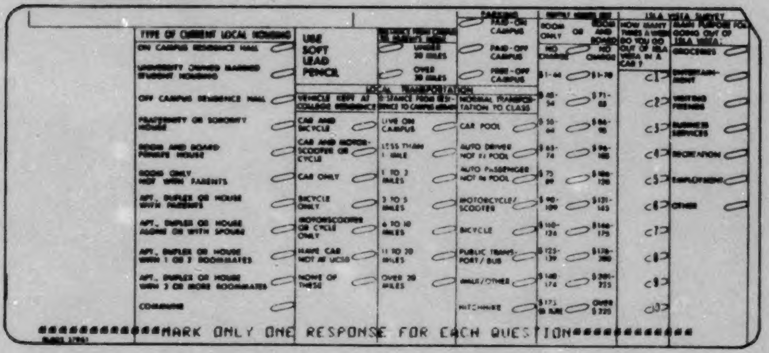
[1] For a complete explanation of the survey technique, see An Approach to Surveying Housing and Transportation Patterns of College and University Students. Ira Stephen Fink and David Bradwell. (Berkeley, California: University of California, Office of the Assistant Vice President--Physical Planning, May 1971.)

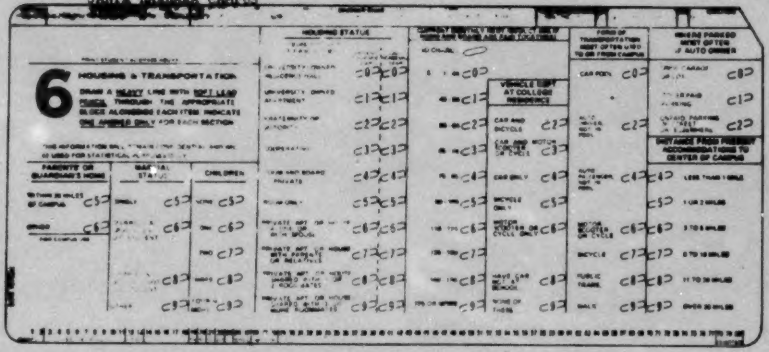
STUDENT HOUSING AND TRANSPORTATION SURVEY CARDS
WINTER QUARTER 1972



BERKELEY CAMPUS


MARK ONLY ONE RESPONSE FOR EACH QUESTION

SANTA BARBARA CAMPUS



LOS ANGELES CAMPUS

from campus." Eight separate modes of transportation--car driver, car passenger, carpool, motorscooter/cycle, bicycle, public transit, walking (and for three campuses, hitchhiking)--are reviewed.

Next, data from the question "vehicle kept at college residence" is separately cross-tabulated with data on: (1) academic class standing (lower division, upper division, graduate), (2) marital status (single, married), (3) sex (male, female), and (4) distance of student residence from campus (by seven distance zones from less than one mile to 20 miles or more).

B. STUDY LIMITATIONS

Before commenting on some of the limitations of the survey data, it appears useful to point out some obvious limitations in the scope of the study.

First, this study does not contain information on how many trips students make to and from campus each day, or how many days per week each student is on campus. It can be assumed that students at different campuses have different propensities to travel back and forth from their campus residence to class. Although the number of student trips would affect the amount of traffic generated by students as much as student travel modes, this study does not contain this type of information.[2]

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[2] The publication, Computer Aided Campus Planning for Colleges and Universities: Interim Report (a research study sponsored by Education Facilities Laboratories and Duke University; Caudill Rowlett Scott; and Hewes, Holz, Willard; August 1967). Based upon student activity diaries, this study indicates that students do not make only a single trip to campus in the morning and then return to residence in the evening; instead they make a number of trips throughout the day between campus and residence.

Second, rather than utilize the original survey instruments for the tabulation of data, this report relies upon cross-tabulations which are prepared immediately following the completion of each year's survey. Thus, despite the capability of the raw data to provide additional information about transportation patterns of students, the survey tables from which this study is taken do not cross-tabulate "transportation most often used to campus" by three important factors which affect traffic generation: academic class standing, marital status and sex. Consequently, it is only possible to infer the number of students who use each type of vehicle from the question "vehicle kept at college residence" cross-tabulations.

These data, however, do suggest: (1) lower-division are more likely to bicycle to campus than upper-division students or graduates; (2) single students are more likely to bicycle to campus than married students; and (3) women are more likely to bicycle to campus than men. Conversely, the same data suggest: (1) upper-division and graduate students are more likely to drive to campus than lower-division students; (2) married students are more likely to drive than single students; and (3) men are more likely to drive to campus than women.

Based upon these inferences, campuses with upper-division and graduate student enrollments increasing at a rate greater than undergraduate enrollment may see an increase in percentage of students driving to campus often at a rate exceeding changes in other transportation modes. Similarly, increases in the number of men enrolled when compared with women enrolled would also imply a greater increase in the number of cars used as transportation to campus.

C. DATA LIMITATIONS

A few words of background on the survey data are necessary before reviewing the data contained in this report. First, the University of California Student Housing and Transportation Surveys, although generally conducted during the Winter Quarter (January) registration, have, on occasion, been conducted on the campus during different semesters or quarters. Consequently, data from one campus to another, or from one year to another, may have variations due to the survey time. These, however, are considered minor and are not taken into account.

Second, because campus enrollments fluctuate from quarter to quarter (decreasing each quarter from Fall to Winter to Spring), the data contained in this report on transportation modes and vehicle ownership has been calculated based upon average three-quarter University enrollments. These enrollments are taken from the University of California's annually published Statistical Summary of Students, Faculty and Staff.

Third, it should be noted that the question on "transportation most often used" does not reflect the transportation modes of students who use more than one mode of transportation to get to campus. For example, at some campuses it is known that some students drive their cars with bicycles on them to the campus vicinity where they park their cars, then ride their bicycles to campus. Because the above dual vehicle use is considered small, this study does not account for bi-modal transportation patterns of these students.

Fourth, there are ambiguities in "vehicle kept at student residence" data. For example, survey data on vehicle "ownership" rates of married students when compared with rates of single students can easily be interpreted. The findings in this study indicate that married students are nearly twice as likely to own a car as single students. Yet, because married students share their car with a spouse while single students do not, the number of cars per person may be no higher among married students than among single students. Further, car ownership data for married students may be overestimated to the extent that an average of ten percent of married students have spouses who are also students[3] and thus would share one vehicle.

Fifth, the question about vehicles kept at college residence does not ask whether students keep more than one car, or one bicycle, or one motorscooter or motorcycle. Consequently, to the extent that students do keep more than one of each vehicle, the total number of student vehicles given in this report may be slightly underestimated. However, the Student Housing and Transportation Survey does ask if a student keeps both a car and a bicycle, and these data have been reported. It is not, however, possible to tell from the survey if the cars being driven to campus are owned (or kept) by the student or by his family. It is assumed that the vehicles are all student-owned.

Sixth, the term "on-campus," one of the categories which is computer programmed in tabulating response to "distance of student residence from campus," has different meanings at different campuses, although the method for calculating it is consistent: at all campuses, "on-campus" includes all single students living in University-owned housing.

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[3] Married Students: A Study of Decreasing Marriage Rates and Family Sizes at the University of California. Ira Stephen Fink and Joan Cooke. (Berkeley, California: University of California, Office of the Assistant Vice President--Physical Planning, March 1973.) p. 24.

The "on-campus" housing, however, is located at varying distances from the campus core or main campus library. For example, at San Diego and Santa Cruz, "on-campus" housing is actually located on-the-campus and within one-quarter mile of the core; at other campuses--such as Irvine--the "on-campus" housing is as far as one-half mile from the campus core. This means that students living "on-campus" at the various campuses travel different distances to reach the campus center. Because travel patterns differ depending on the precise distance of travel, there is some variation in the data due to the variable location of what is considered "on-campus" housing.

Also, in the Student Housing and Transportation Survey, married University students living in University-owned housing list the distance of their housing as they perceive it. At Berkeley, this housing is actually three miles from campus; at Santa Cruz it is about one mile from the campus core area; at Los Angeles, it is three miles from campus; and at all other campuses it is within one mile of the campus core.

In conclusion, the data collected for this study has been designed to minimize misinterpretation. However, the reader should be aware that, as in any survey, problems of ambiguity of some questions, as well as problems of definition, may exist.

D. CAMPUS ENVIRONS

To assist in identifying the campus and their environs, this report includes a series of maps prepared for the University by Sedway/Cooke of San Francisco.[4] Also, where appropriate, recent campus parking maps, prepared for campus visitors, and aerial photographs of the campus and environs are reproduced.

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[4] University of California Campus Environs Survey, Volume 2: Maps of Environs Factors. A study undertaken by Sedway/Cooke for the

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University of California, Office of the President, Assistant Vice President--Physical Planning and Construction, Berkeley: University of California, October 1970.

IV. FACTORS SHAPING STUDENT TRANSPORTATION PATTERNS

A. PREVIOUS RESEARCH

Research into the factors governing student travel patterns reveal that there is little consensus on precisely what factors shape a campus travel orientation.

One study, conducted by V. Setty Pendakur, of the University of British Columbia, argues that many factors determine the travel characteristics of university populations: These include: (1) university parking policy, (2) availability and level of service of alternative transportation modes, and (3) university housing policy.[1] Another study, forecasting travel patterns and parking demand at the University of California, Irvine, suggested five features determine student transportation patterns: (1) on-campus housing policies, (2) off-campus housing policies, (3) university policies regarding campus parking regulations, (4) variations in income distribution, and (5) availability of different transportation modes.[2]

This study about the nine University of California campuses uses some of the factors identified in the studies cited above and further suggests additional factors which have been influential in determining campus travel characteristics at the University of California. (Table 1 delineates some of the important characteristics of the nine University campuses.)

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[1] V. Setty Pendakur, "Access, Parking and Cost Criteria for Urban Universities," Traffic Quarterly, Volume 22, Number 3. (July 1968), pp. 361-362.

[2] J. D. Drachman Associates, Long Range Development Plan: Traffic and Parking Study, University of California, Irvine, February 1971, p. 3.

TABLE 1

ENROLLMENT, LAND, AND TRANSPORTATION BACKGROUND DATA ABOUT THE UNIVERSITY OF CALIFORNIA CAMPUSES

1971-72

	Berkeley	Davis	Irvine	Los Angeles	Riverside	San Diego	San Francisco	Santa Barbara	Santa Cruz	Univ Wide
Enrollment (1971-72):	27,119	13,718	6,519	26,763	5,782	6,175	2,647	12,239	4,209	105,171
Estimated Campus Core Area (Acres):	200	500	500	300	300	500	20	400	500	
Total Main Campus Area, 1971-72 (Acres):	1,239	3,619	1,501	411	1,101	1,362	107	572	2,001	
Student Population per Acre of Campus Core Area (1971-72):	135	27	13	89	19	12	132	31	8	
Percent of Students Living at Various Distances from Campus (1971-72):										
On-Campus	13%	28%	26%	16%	22%	35%	21%	20%	46%	21%
0-1 Mile	46	24	4	16	21	8	42	43	7	27
1-2 Miles	15	35	4	10	17	6	9	17	9	15
More than 3 Miles	26	13	66	58	40	51	28	20	38	37
Total:	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Percent of Students Using Different Transportation Modes to Campus (1971-72):										
Car driver	20%	17%	66%	45%	46%	51%	27%	16%	28%	32%
Car passenger	3	3	10	5	6	15	4	2	16	5
Car pool	1	2	5	7	3	5	3	2	3	4
Motorcycle/Scooter	2	2	2	3	2	3	2	1	1	2
Bicycles	12	64	6	5	17	6	1	58	4	21
Public Transit	8	4	0	9	1	4	12	1	36	7
Walk	49	8	11	26	25	16	51	19	12	27
Hitchhike	5	-	-	-	-	-	-	1	-	2
Total:	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Percent of Students Owning Vehicles (1971-72):										
Car	53%	56%	74%	64%	67%	53%	68%	52%	33%	58%
Motorcycle/Scooter	2	3	3	5	4	4	1	1	2	3
Bicycle	29	82	31	19	37	30	16	72	29	38
None	32	5	18	29	17	32	28	11	46	24
Total:	116%	146%	126%	117%	125%	119%	113%	136%	110%	123%
(Both Car and Bike)	(16%)	(46%)	(26%)	(17%)	(25%)	(19%)	(13%)	(36%)	(10%)	(23%)
Number of Campus Parking Spaces per 100 Campus Students, Faculty and Staff (1971-72):	15.9	35.5	52.0	48.0	57.2	49.7	17.8	30.3	51.7	36.3

As described below, this study focuses on five factors dominant in determining a student's travel orientation. They are: (1) proximity and concentration of student housing, (2) availability and quality of alternative transportation modes, (3) scale and intensity of environs development, (4) topography of the campus and environs, and (5) campus/community policies on student transportation. Each factor is separately discussed below.

B. PROXIMITY AND CONCENTRATION OF STUDENT HOUSING

The importance of the first factor--proximity to campus and concentration of student housing--is suggested in Pendakur's study of student parking demands. Pendakur, basing his findings on survey information from twenty-five Canadian universities and from twenty-eight North American universities observed that the percentage of students commuting daily to a university is a function of the percentage of total student population living on campus.[3]

Using his assumption--that campus housing policy has a direct influence on campus travel patterns--the following hypothesis was formulated for the University of California campuses: campuses housing a low proportion of students in University-owned on-campus housing would have an automobile orientation, while, conversely, campuses housing a high proportion of students would have a bicycling or pedestrian orientation. To test this hypothesis, the proportion of students in on-campus housing at the nine University of California campuses was compared with the dominant student transportation orientation of each campus.

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[3] Pendakur, op. cit., p. 362.

TABLE 2

STUDENTS LIVING IN UNIVERSITY OWNED ON-CAMPUS HOUSING BY CAMPUS PRIMARY TRANSPORTATION ORIENTATION

1971-72

	Percent of Students Living in University Owned on-Campus Housing (1971-72)	Campus Primary Transportation Orientation
Berkeley	13%	Pedestrian
Davis	28%	Bicycle
Irvine	26%	Auto
Los Angeles	16%	Auto
Riverside	22%	Auto
San Diego	35%	Auto
San Francisco	21%	Pedestrian
Santa Barbara	20%	Bicycle
Santa Cruz	40%	Auto-Public Transit
University-wide Average	21%	

As revealed in Table 2, the hypothesis was not confirmed. As shown in the table, there are no obvious correlations between a high percentage of students living in University-owned on-campus housing and a pedestrian or bicycling orientation or conversely a low percentage of students living in on-campus housing and an automobile orientation. In fact, at three out of the four bicycle or pedestrian-oriented campuses (Berkeley, San Francisco and Santa Barbara), a low percentage of the students (generally less than twenty percent) live in on-campus housing, while generally at the auto-oriented campuses, a higher percentage of students (more than twenty percent) live in on-campus housing. This finding shows that at the University of California campuses the proportion of students housed in University-owned housing is not the single determining factor most directly affecting campus student travel mode or campus transportation orientation.

To provide a better forecasting tool, it was decided it might be more fruitful to combine both University-owned on-campus housing and the private sector housing supply within a given radius of campus (two miles) instead of simply measuring how much housing was supplied by the University on campus. This analysis, shown in Table 3, proved productive.

Table 3 shows a cross-tabulation of the percentage of students housed within two miles of campus, both in University and in private housing by the dominant student transportation orientation of each campus. The table indicates that a high percentage of students living within two miles of campus correlates with a pedestrian or bicycle transportation orientation, while a low percentage of students housed within two miles of campus correlates with an automobile or auto-public transit travel pattern.

TABLE 3

PERCENTAGE OF STUDENTS LIVING WITHIN ONE AND TWO MILES OF CAMPUS BY CAMPUS TRANSPORTATION ORIENTATION

1971-72

	CAMPUS TRANSPORTATION ORIENTATION			
	Pedestrian	Bicycle	Auto	Auto-Public Transit
Campus	1 mile/2 miles	1 mile/2 miles	1 mile/2 miles	1 mile/2miles
Berkeley	59%/74%			
Davis		52%/87%		
Irvine			30%/34%	
Los Angeles			32%/42%	
Riverside			43%/60%	
San Diego			43%/49%	
San Francisco	63%/72%			
Santa Barbara		63%/80%		
Santa Cruz				53%/62%

NOTE: The first number is percent of students living both on-campus and within one mile of campus; the second number is percent of students living within two miles of campus.

Table 3 further illustrates that the pedestrian-oriented campuses (Berkeley and San Francisco) have the highest concentration of students living within one mile of campus (58 percent to 63 percent of all students enrolled on these campuses), while the bicycle-oriented campuses (Davis and Santa Barbara) have the highest concentration of students living within two miles of campus (80 percent to 87 percent of all students enrolled on those campuses).

The auto-oriented campuses (Irvine, Los Angeles, Riverside, and San Diego) have the lowest percentage of students living within one mile of campus (30 percent to 43 percent of their students) as well as the lowest percentage living within two miles (34 percent to 58 percent).

C. AVAILABILITY AND QUALITY OF ALTERNATIVE TRANSPORTATION MODES

The second factor tested for its effect on campus travel patterns--the availability of quality of alternative transportation modes--was hypothesized to influence student travel patterns in the following ways: the availability of public transit and bicycle routes and paths would encourage either a public transit or bicycling orientation, while an absence of these facilities would encourage an automobile or pedestrian-orientation. Also, campuses with easy access from large arterial streets and highways would develop an automobile-orientation, while campuses with easy pedestrian access would develop a pedestrian orientation. Evidence gathered from the campuses tended to confirm this hypothesis.

The availability and quality of alternative transportation modes is shown to influence campus trends in the following examples: the only University of California campus to develop a public transportation system specifically tailored to student needs--Santa Cruz--was the only campus where a substantial proportion of students (35%) used public transportation in 1971-72. The two campuses--Davis and Santa Barbara--which developed extensive physical facilities for linking the campus and community by bicycle networks indeed had a bicycle orientation. The four campuses most accessible by highways and large arterial roads--Irvine, Los Angeles, Riverside and San Diego--were automobile-oriented. Finally, the campuses with most pedestrian entrances and easiest pedestrian access--Berkeley and San Francisco--were pedestrian-oriented.

D. SCALE AND INTENSITY OF ENVIRONS DEVELOPMENT

The third factor affecting campus travel orientation--the scale and intensity of environs development--was postulated to relate to campus travel in the following way: campuses with highly urbanized environs should tend to be bicycle-oriented; and campuses with an undeveloped or underdeveloped campus environs should tend to be automobile-oriented.

Although the above hypothesis is generally true (Los Angeles--Westwood is the exception), the relationship between intensity of environs development and campus transportation orientation suggests that student proximity to a number of their urban activity needs and services also affects transportation choice. If student-oriented shopping, employment, recreation, entertainment and housing are located beyond the immediate campus environs, regardless of the scale and intensity of environs development, students tend to drive from campus to reach these activities and then return to campus. When these student-oriented activities and services are available in the immediate campus environs, students are encouraged to walk or bicycle to these activities and back to campus to their residence.

E. TOPOGRAPHY OF THE CAMPUS AND ENVIRONS

The fourth factor--topography of the campus and the environs--was also an important factor affecting campus travel patterns. At the San Diego and Santa Cruz campuses, the steep topography of the campus and its surrounding environs and the distances between facilities on the campus discourages students from bicycling to campus and encourages them to use cars or public transportation to overcome the hillyness. By contrast, at Davis and Santa Barbara, the flat terrain of the campus and its environs provides a setting hospitable to a bicycle orientation and serves to encourage bicycle use.

Although the Irvine and Riverside campuses are relatively flat, and thus might have a large bicycle population, the environs' topography at Irvine includes several large arterial roads without bicycle paths, and at Riverside, the campus is bisected by a freeway, thus inhibiting bicycle use.

F. CAMPUS AND COMMUNITY TRANSPORTATION POLICIES

The fifth and final factor--campus or community policies on alternative student transportation modes--could either encourage or discourage particular student travel patterns. Campus policies dealing with the provision of parking, either implicitly or explicitly favoring parking for student autos, were also found to alter student travel patterns.

Pendakur hypothesized the relationship between campus parking policy and travel patterns in this way:

> Travel characteristics of the university population are determined by university parking policy. A university providing abundant space for all segments of the

> population will experience a substantilly higher demand for parking than one which imposes parking controls on all or some segments of the population.[4]

To test the relationship between campus parking policy and campus travel orientation, information on the number of parking spaces available in 1971-72, and the number of full-time students, faculty and staff was collected for each campus. By dividing the number of parking spaces by the campus population, the number of parking spaces per 100 campus population was developed. This calculation is summarized in Table 4.

Table 4 also classifies the parking data by the dominant student travel orientation of the campus. This table shows that the pedestrian campuses have the lowest number of parking spaces per 100 students, faculty and staff (15.9 to 17.8); the bicycle-oriented campuses have a slightly higher number of parking spaces (30.3 to 35.5); and the automobile-oriented campuses have the highest number of parking spaces (48.0 to 57.2). [A more detailed discussion of how per capita parking space, parking cost, and campus size affects campus travel patterns is given in Pendakur's article. It shows that per capita, parking decreases with increasing campus population, parking costs and campus size.]

Because of paucity of data on the amount and availability of parking in the campus environs (either on-street or in pay-lots), it is not possible in this study to evaluate the effect of off-campus parking on this hypothesis. Undoubtedly, the availability of off-campus parking and its proximity would greatly affect the transportation orientations of each campus. Students are known, or at least blamed, for much of the parking congestion in the campus environs areas.

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[4] Pendakur, op. cit., p. 361.

TABLE 4

NUMBER OF CAMPUS PARKING SPACES
UNIVERSITY OF CALIFORNIA

1971-72

Campus	Number of Parking Spaces[1]	Campus Population			Number of Parking Spaces Per 100 Population	Campus Transportation Orientation
		Fac-Staff[2]	Students[3]	Total		
Berkeley	5,478	[illegible]44[4]	27,119	34,263	15.9	Pedestrian
Davis	6,395	4,318	13,718	18,036	35.5	Bicycle
Irvine	4,208	1,580	6,519	8,099	52.0	Heavy-Auto
Los Angeles	17,467	9,631	26,763	36,394	48.0	Moderate-Auto
Riverside	4,302	1,744	5,782	7,526	57.2	Moderate-Auto
San Diego	5,652	5,190	6,175	11,365	49.7	Heavy-Auto
San Francisco	1,343	4,915	2,647	7,562	17.8	Pedestrian
Santa Barbara	4,370	2,163	12,239	14,402	30.3	Bicycle
Santa Cruz	2,703	1,017	4,209	5,226	51.7	Auto-Public Transit
TOTAL/AVG.	51,918	38,034	105,171	143,205	36.3	

Sources: [1] "University of California Parking Spaces, Comparison of June 30, 1971 with June 30, 1972," Appendix H2, The Physical Facilities of the University of California, 1971-72 Annual Report, Office of the President, Vice President--Planning.

[2] Full time faculty and staff employees only

[3] Three-quarter average enrollment

[4] Includes 1,013 employees of the Office of the President

G. SUMMARY

In general, it was found that five factors shape the student travel orientation of a campus: (1) the location of student housing--can students live close to campus or must they live far away; (2) the existing transportation and circulation system--are alternative non-auto travel modes (pedestrian, bicycle, public-transit) accommodated or encouraged in the campus environs; (3) the intensity and variety of student-oriented urban development surrounding the campus--what distance must students travel from campus to reach and to satisfy their shopping, work, recreation, and entertainment needs; (4) the topography of the campus and environs--does topography discourage or encourage walking and bicycling; and (5) campus transportation policy--do campus policies exist which encourage different student transportation modes and what is the campus policy on the amount of student parking the campus provides.

Not all of these five factors are equally important for each campus, nor do they all apply in establishing specific student transportation patterns. However, in one combination or another, they are the most significant factors in determining the transportation orientation of a campus.

V. CONCLUSIONS

A. GENERAL

1. Each University of California campus can be classified according to the most popular student transportation orientation.

In 1971-72, at each campus except Santa Cruz, the most popular student transportation mode was used by approximately one-half or more of the student population. For example, as shown in Table 1, Berkeley and San Francisco could be classified as pedestrian-oriented campuses because 49% of Berkeley students and 51% of San Francisco students walked to campus; Davis and Santa Barbara could be classified as bicycle-oriented campuses because 64% of Davis students and 58% of Santa Barbara students bicycled to campus; Los Angeles and Riverside could be classified as moderately automobile-oriented campuses because 57% of Los Angeles students and 55% of Riverside students used cars to travel to campus; Irvine and San Diego could be classified as heavily automobile-oriented campuses because 81% of Irvine students and 72% of San Diego students used cars to travel to campus; finally, Santa Cruz could be categorized as an automobile-public transit-oriented campus because 28% of its students used cars and 36% of its students used public transit to travel to campus.

2. Although student modes of transportation differ considerably among the campuses, the percentage of students keeping a car at their campus residence did not vary markedly from the campuses with a non-auto orientation to the campuses with complete dependence upon the auto.

With the exception of the Santa Cruz campus (where in 1971-72, only 35% of students kept cars), between 52% (Santa Barbara) and 74%

TABLE 5

CARS KEPT AT STUDENT RESIDENCES

All Campuses
1967-68 and 1971-72

Campus	Percentage of Students Keeping Cars	
	1967-68	1971-72
Berkeley	52%	53%
Davis	52	56
Irvine	68	74
Los Angeles	67	64
Riverside	68	67
San Diego	57	60
San Francisco	65	69
Santa Barbara	53	52
Santa Cruz	29	35
University-wide Average	58%	58%

(Irvine) of students at every University of California campus kept cars at their campus residence, with a University-wide average of 58% students with cars. Significantly, as shown in Table 5, this percentage of University of California students keeping cars did not change over the past few years; for example, in 1967-68, between 52% (Berkeley and Davis) and 68% (Irvine and Riverside) of the students kept their cars again with a University-wide average of 58% of students keeping cars.

3. In contrast to the consistently high rate of automobile ownership among students, bicycle ownership varied considerably from campus to campus.

As shown in Table 1, in 1971-72, with the exception of the two bicycle-oriented campuses--Davis and Santa Barbara (where 82% and 71% of students respectively owned bicycles)--between 16% (San Francisco) and 37% (Riverside) of the students on the other seven University of California campuses kept bicycles at their campus residences. Overall, in 1971-72, 38% of all University students kept a bicycle.

4. Although nearly 60% of all University students owned cars, and nearly 40% owned bicycles, it was the dominant transportation orientation of the campus and not necessarily student vehicle ownership which influenced the probability that students would use the vehicles they kept as their means of transportation to campus.

As shown in Table 6, students at pedestrian-oriented campuses (Berkeley and San Francisco) tended to leave both their cars and their bicycles at their campus residences and walk to campus; students at the bicycle-oriented campuses (Davis and Santa Barbara) tended to take their bicycles to campus and left their cars at their campus residences; students at car-oriented campuses (Irvine, Los Angeles, Riverside, and San Diego)

TABLE 6

PROBABILITY OF VEHICLE OWNERS USING THEIR VEHICLES FOR TRANSPORTATION TO CAMPUS

All Campuses
1971-1972

	Transportation Orientation	Probability of Car Owners Driving to Campus	Probability of Bicycle Owners Riding to Campus
Berkeley	Pedestrian	0.38	0.41
Davis	Bicycle	0.30	0.78
Irvine	Automobile	0.89	0.19
Los Angeles	Automobile	0.70	0.26
Riverside	Automobile	0.69	0.46
San Diego	Automobile	0.85	0.21
San Francisco	Pedestrian	0.39	0.06
Santa Barbara	Bicycle	0.31	0.82
Santa Cruz	Auto-Public Transit	0.80	0.14
University-wide Average Probability		0.55	0.55

tended to take their cars to campus and left their bicycles at their campus residences.

5. Campus transportation policies were very effective in altering student travel patterns.

At the bicycle-oriented campuses (Davis and Santa Barbara), and the auto-public transit-oriented campus (Santa Cruz), efforts to discourage car use by limiting (or eliminating student parking) while encouraging and developing a more balanced transportation system had considerable impact on the transportation orientation of the student population.

At Davis and Santa Barbara, a number of campus and community characteristics were conducive to bicycling; the flat terrain, the isolation of the campus from heavy urban development and traffic, and the quantity of student-oriented housing within bicycling distance of campus were all significant.

Yet, the cruical factors which encouraged the popularity of bicycling at Davis and Santa Barbara were the considerable efforts these campuses made: first, to separate car, bicycle and pedestrian traffic by providing bikeways, bike paths, grade separated crossings and underpasses, and by closing off the central portion of the campus to cars; second, to provide convenient bicycle storage by placing bike racks close to academic buildings; and third, to discourage bicycle theft through the use of bicycle patrols and campus bicycle registration.

For example, in 1967-68, prior to these efforts at Santa Barbara, 28% of the students bicycled to campus; after the improvements, in 1971-72, 58% of the students bicycled.

6. Only one campus (Santa Cruz) effectively developed a transportation system which encouraged a large proportion of students to use public transportation--in 1971-72, 36% of Santa Cruz students used the student subsidized municipal bus system.

The experience in developing and encouraging public transit at Santa Cruz suggests that if public transportation is to become a popular mode of transportation, a campus must work closely with the public transit authorities specifically to tailor the transit facilities to meet student travel needs.

For example, to maximize student interest, bus service to the campus should: (1) connect integrally with bus service on campus; (2) charge a nominal cost, perhaps to be paid by a special student assessment once in the beginning of the school year or quarter; (3) attract students who generally travel to campus as "auto-passengers" (or "hitchhikers"); and (4) develop routes which include the student residential areas between three and ten miles of campus.

The experience in developing public transit at Santa Cruz suggests that Irvine, Los Angeles and San Diego are campuses where public transit should also be attractive if available. All three of these campuses have (1) a large number of students traveling to campus as "auto-passengers"; (2) a large number of students living within three to ten miles of campus; and (3) a campus layout that requires students to travel considerable distances between classes and buildings.

However, other campuses--including Berkeley, Los Angeles, and San Francisco--which have clearly recognized the need to increase the attractiveness and use of public transportation, have, so far, been only partically successful in making public transportation an important travel mode. As shown in Table 1, public transportation at these campuses is used by only 8% to 12% of the students. (At Berkeley, 48% of the students walk, 25% use autos, 8% use public transit; at Los Angeles, 25% walk, 57% use cars, and 9% use public transit; at San Francisco, 51% walk, 34% use cars, and 12% use public transit.

B. THE PEDESTRIAN CAMPUSES

1. The distinguishing characteristic of the pedestrian campuses (Berkeley and San Francisco) was that an unusually large number of students walk to campus even though they own cars or bicycles. This was the result of the interaction of three factors:

First, it was not convenient to drive. Whether due to campus policy, space limitations or both, the pedestrian campuses had by far the fewest parking spaces available on campus. This was compounded by the fact that both Berkeley and San Francisco are urban campuses, their environs are congested with traffic, and students compete with local residents for the available street parking.

Second, it was not convenient to bicycle. Many students were discouraged by the hilly terrain, particularly at San Francisco, as well as the dangers posed by congested city streets. Neither campus made a concerted effort to promote the use of bicycles.

Third, a high percentage of the students lived within easy walking distance of campus. Only one other campus--Santa Barbara--had as many students living within a one-mile radius of the campus as either Berkeley or San Francisco. The concentration of students in close proximity to the campus was the necessary prerequisite to having a pedestrian-oriented campus, but it was probably not sufficient unless it was inconvenient to drive or to bicycle. As the Irvine campus illustrates, if there are not obstacles to driving, many students living close to campus will drive their cars, and Santa Barbara provided the example that students will ride bicycles when there is a flat terrain and some encouragement by the campus for bicycles.

2. At the pedestrian-oriented campuses, measurement of per capita car ownership does not provide a good indication of the amount of traffic generated by students. Although the car ownership rate in 1971-72 among students at Berkeley (53%) and San Francisco (69%) was about the same as for students at other campuses (University-wide average is 58%), most students at Berkeley and San Francisco walked to campus and were considerably less likely to use the vehicles they owned for transportation to campus than students at other campuses.

3. At the pedestrian-oriented campuses, students of different academic class standing, marital status, and sex had similar rates of bicycle ownership, while car ownership rates among these same groups varied considerably. Upper-division, graduate, and men students had higher rates of car ownership than the lower-division and women students.

4. At the pedestrian campuses, policies designed to accommodate the bicycle equally increased the accessibility of the campus to all students, while policies to accommodate the car increased the accessibility of the campus to graduates, upper-division and men students to a greater extent than to lower-division or women students.

C. THE BICYCLE-ORIENTED CAMPUSES

1. An important characteristic of the bicycle-oriented campuses (Davis and Santa Barbara) was that students who owned cars left their cars at their campus residences, and students who owned bicycles rode their bicycles to campus.

2. Both the Davis and Santa Barbara campuses were dominated by bicycles. More students at these two campuses owned bicycles than owned cars, and most used their bicycles as transportation to campus. This orientation was caused by the combination of three factors:

First, use of automobiles was discouraged. At each bicycle-oriented campus the administration restricted the number of student cars allowed access to the campus by closing off certain areas of campus completely, as at Davis, or by limiting access and restricting parking permits, as at Santa Barbara.

Second, use of bicycles was encouraged. The environs of both the Santa Barbara and Davis campuses are naturally conducive to bicycles because the terrain is level and there is less pedestrian and car traffic congestion than at the more urban campuses. Moreover, to encourage bicycle usage to reach high levels, the campuses and the adjacent communities developed networks of bicycle paths to separate cyclists from motor vehicles safely and provided other facilities, including bicycle parking lots, to diminish the inconvenient aspects of bicycle use. Student initiative also played a role in encouraging bicycle use, particularly at Davis.

Third, most students lived within bicycling distance of campus. Of the nine University campuses, Davis and Santa Barbara had the highest percentages of students living within two miles of campus. This was an important factor in predicting the number of vehicles expected to be brought to campus because seventy percent of the students living within a two-mile range, the number of bikes would certainly decrease, and in inverse proportion to the increased number of cars.

3. Another characteristic of the bicycle-oriented campuses was that they showed relatively marked differences in the likelihood of a student owning a bicycle depending on whether a student was a lower, upper or graduate division student, was a man or a woman, and was married or single. This was in contrast to other campuses where recreation, rather than transportation, seemed to be the dominant reason for owning a bicycle. At the campus where bicycles were used for recreation, those least likely to own bicycles were men, married students and graduate students; these groups were also the most likely to own cars.

D. THE MODERATELY-AUTOMOBILE-ORIENTED CAMPUSES

1. Los Angeles and Riverside are both classified as moderately-automobile-oriented campuses because of the considerable probability (70%) that if a student owns a car he would bring it to campus, with the result that in 1971-72, 50% of all enrolled students used cars as transportation to campus.

2. The similar orientation or moderate automobile use resulted from different factors (as a consequence, the two campuses have different potentials for changes in their transportation patterns):

First, a significant number of students lived beyond three miles of campus. At Riverside, 40% of the students lived three or more miles of the campus, and 58% did so at Los Angeles. This meant that a substantial number of students lived far away from the campus and, thus, had no convenient alternative to driving.

Second, although bicycling was convenient at Riverside, driving was not discouraged. Bicycle owners living within two miles of the Riverside campus had a relatively high probability (56%) of using their bikes for transportation. This suggested that bicycling was not inconvenient. However, car owners living within two miles showed an even higher probability (72%) that they would bring their cars to campus (probably because driving was not discouraged and because Riverside had, in 1971-72, the highest ratio of parking spaces to students of any of the campuses). Incentives for students to shift from cars to bicycles, and a campus policy which discouraged driving and encouraged students to live closer to campus, would probably reduce the number of cars going to the campus.

Third, bicycling at Los Angeles was more recreation than transportation-oriented. For example, [illegible] Angeles had a much greater percentage of students living beyond walking [illegible]king distance (58% live three or more miles from campus) than Riverside; Los Angeles students were less likely to own bicycles than students at most campuses; there was a smaller probability that students who owned bicycles would use their bikes; and when bicycle use increased at Los Angeles, it tended to replace students who normally would have walked to campus rather than drive. Even if efforts to promote the use of bicycles was initiated at Los Angeles, it would probably have a lesser impact than at Riverside.

3. At the moderate automobile campuses, increased use of public transportation appears to be a likely alternative to car usage. At Los Angeles, such a shift would probably have to be part of a general change in

travel orientation of the residents of the Los Angeles area; at Riverside, the transit system would need to be better integrated into other forms of transportation.

4. At the moderate automobile campus, increasing the amount of housing available to students within one or two miles of campus and limiting the number of student parking permits would reduce number of student drivers.

E. THE HEAVILY-AUTOMOBILE-ORIENTED CAMPUSES

1. The bulk of the students at Irvine and San Diego used cars to get to campus, and through 1971-72 their numbers increased at a faster pace than campus enrollments.

This suggests that as enrollments grow in the future, the number of cars coming to campus will continue to grow unless efforts are made to reverse this trend. This could be done either by encouraging a more balanced transportation system, particularly bicycling and public transit, so that the percentage of students depending on cars to get to campus would drop, or, by encouraging an increase in the number of students living within one mile of campus through the construction of additional student housing.

2. Because of certain characteristics of the campuses, it would be possible to take action to reverse the dependency upon the automobile. The following factors contributed to the high automobile use:

First, the amount of student-oriented housing, in close proximity to campus was limited. New building of student housing did not keep pace with increased enrollments and, as a result, more and more students were forced to seek housing at distances beyond walking and bicycling distance of campus. If greater numbers of students could be housed in close proximity to the campus, it would result in a shift of transportation forms from driving to walking or bicycling.

Second, students were not discouraged from driving. Access to campus by highways and freeways is not limited, and both the Irvine and San Diego campuses provided the highest ratio of parking spaces to students, faculty and staff on any campus except Riverside.

Third, the campus environs were not conducive to bicycling. Over one-third of the students living within two miles of both the Irvine and San Diego campuses owned bicylces, and neither campus is in a congested urban area. Thus it might be possible that these students could be induced to ride their bicycles to campus if there was an effort to separate car and bicycle traffic and to provide other facilities for the convenience of bicyclists.

3. At the heavily-automobile-oriented campuses, the promotion of public transit to the campuses could affect the transportation patterns of students living more than three miles from campus. Experience in developing a transit system at the Santa Cruz campus shows that most of the students now using public transportation were formerly car passengers or hitchhikers. The substantial number of students who are car passengers at both Irvine (10%) and San Diego (15%) suggest that these campuses also have a potential market for public transit.

4. At the heavily-automobile-oriented campuses, policies which increase the convenience of using cars aid the mobility of graduate students, married students and men (groups who own more cars and tend to live farther from the campus) and other segments of the campus population.

5. Policies which encouraged bicycling at the heavily-automobile-oriented campuses affected all students equally because bicycle ownership did not vary as signficantly from student group to group as the bicycle ownership patterns at the bicycle-oriented campuses.

F. THE AUTOMOBILE AND PUBLIC TRANSIT-ORIENTED CAMPUS

1. While there was a significant increase in the use of public transit at Santa Cruz, there was only a partial reduction in the percentage of students coming to campus as car drivers; thus, these separate transportation modes of public transit and automobile appeal to different segments of the student population, with the result that policies which affected one group may not affect the other.

2. Students who used public transportation at the Santa Cruz campus formerly came to campus as auto passengers or hitchhikers.

This shift in transportation modes partially reduced the number of cars which otherwise would have been driven to the campus. Campuses with a substantial number of students arriving on campus as auto passengers may also have a ready-market for public transit.

3. The Santa Cruz experience indicates that to decrease the number of students driving cars to campus, the following was necessary:

First, the number of students living on-campus was increased.

Second, alternative transportation systems were provided. A student subsidized bus system was begun in 1970.

Third, students were discouraged from driving. At Santa Cruz, a limit to the amount of on-campus parking spaces was enacted and students were encouraged to leave their cars at home. Because of the dispersion of activity at Santa Cruz, both on and off campus, the few students who did keep cars at their Santa Cruz residences had a high probability (80%) of using the cars each day despite the availability of public transit.

4. Among the reasons that the student subsidized public transit was so popular at Santa Cruz was that it not only connected the campus to the surrounding community, thus providing the riders with access to housing, shopping, and recreation, but it also circulated through the campus, thereby taking the student from both off-campus and on-campus residences directly to classes or close to them at convenient time intervals.

VI. UNIVERSITY-WIDE

A. TRANSPORTATION MODES

1. The most common way to travel to and from campus was by automobile.

As shown in Table 7, of the 105,171 students attending the nine campuses of the University of California in 1971-72, 32% of students drove cars to campus and 9% were in car pools or were auto passengers. Of the remaining students, 27% walked to campus, 21% bicycled, 7% used public transportation, 2% used motorcycles and motorscooters, and 2% hitchhiked.

2. The most interesting change that has taken place in the transportation modes of students has been the increased interest in bicycling.

As shown in Table 7, on a University-wide basis, bicycling as a mode of transportation to campus doubled in popularity in six years; in 1965-66, 12% of students bicycled to campus, in 1971-72, 21% of students bicycled to campus.

3. Bicycle use increased most at the three campuses where bicycling was always popular.

At Davis, 4,172 (54% of the 7,727 students) rode bicycles to campus in 1965-66; the number of students riding bicycles to campus increased to 8,746 (64% of the 13,718 students) in 1971-72. At Santa Barbara, 2,438 (26% of the 9,278 students) bicycled to campus in 1965-66 and 7,072 (58% of the 12,239 students) bicycled to campus in 1971-72. Finally, at Riverside, 174 of the 3,476 students (5%) bicycled to campus in 1965-66, while 980 of the 5,782 students (17%) bicycled to campus in 1971-72.

TABLE 7

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS

University-wide

1965-66, 1967-68, 1969-70, and 1971-72

TRANSPORTATION MODE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students	78,043	100%	91,890	100%	103,524	100%	105,171	100%
Car Driver	24,459	31%	28,259	31%	33,806	33%	33,498	32%
Car Passenger	3,941	5	4,713	5	5,530	5	5,566	5
Car Pool	5,761	7	2,611	3	3,686	4	3,722	4
Motor Scooter or Cycle	3,509	5	3,698	4	3,286	3	2,444	2
Bicycle	8,999	12	11,513	13	15,385	15	22,490	21
Public Transportation	4,719	6	5,066	5	6,111	6	7,125	7
Walk	26,655	34	36,030	39	35,720	34	28,737	27
Hitchhike	--	NA	--	NA	--	NA	1,589	2
TOTAL	78,043	100%	91,890	100%	103,524	100%	105,171	100%

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

At five campuses (Berkeley, Irvine, Los Angeles, San Diego, and San Francisco), there was a slight increase in the percentage of students using bicycles--5% or less. At Santa Cruz there was not a corresponding increase in bicycle use in the period, 1965-66 to 1971-72.

4. Because bicycling to campus has become more popular in the past few years, it has replaced other modes of transportation.

At four campuses where bicycling has increased in popularity, the form of transportation which has been displaced varies. At Riverside, bicyclists replaced automobile users; at Berkeley, they replaced pedestrians; and, at Davis and Santa Barbara, they replaced both car users and pedestrians.

a. An example of bicyclists replacing automobile users is illustrated by the Riverside campus. While the percent of students at Riverside using bicycles for transportation to campus increased from 5% in 1965-66, to 17% in 1971-72, and the percent of students walking to campus increased from 11% to 25%, the percent of auto-oriented students correspondingly dropped from 79% to 55% (see Table 51).

b. In contrast to Riverside, Berkeley is an example of a campus where bicyclists have replaced students who formerly walked to campus. The percent of the student population bicycling to campus increased from 7% to 12% between 1965-66 and 1971-72, while the percent of students walking to campus decreased from 60% to 49%. (All other transportation modes at Berkeley remained relatively constant (see Table 22).

c. Davis and Santa Barbara are examples of campuses where an increase in bicycling has meant a corresponding decrease in both pedestrian and automobile traffic. Table 27 shows that bicyclists at Davis increased from 54% in 1965-66, to 64% in 1971-72, while pedestrians decreased from 15% to 8%, and automobile users decreased from 29% to 22%.

TABLE 8

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS
BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

University-wide

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	21,715	28,687	15,858	12,580	9,898	10,051	6,382	105,171	4.31
Car Driver	2,286	2,054	3,532	6,384	6,750	7,435	5,057	33,498	9.42
Car Passenger	1,657	432	636	1,009	795	661	376	5,566	5.50
Car Pool	227	176	328	650	712	1,023	606	3,722	10.27
Motor Scooter or Cycle	206	375	578	662	361	199	63	2,444	4.58
Bicycle	5,711	8,703	6,265	1,465	273	73	0	22,490	1.12
Public Transportation	1,240	664	1,365	2,030	956	598	272	7,125	4.71
Walk	10,106	15,535	2,846	250	0	0	0	28,737	.61
Hitchhike	282	748	308	130	51	62	8	1,589	1.87
TOTAL	21,715	28,687	15,858	12,580	9,898	10,051	6,382	105,171	4.31

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 9

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

University-wide

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	21,715	28,687	15,858	12,580	9,898	10,051	6,382	105,171	4.31
Car Driver	11%	7%	22%	51%	68%	74%	80%	32%	9.42
Car Passenger	8	2	4	8	8	6	6	5	5.50
Car Pool	1	1	2	5	7	10	9	4	10.27
Motor Scooter or Cycle	1	1	3	5	4	2	1	2	4.58
Bicycle	26	30	40	12	3	1	0	21	1.12
Public Transportation	6	2	9	16	9	6	4	7	4.71
Walk	46	54	18	2	0	0	0	27	0.61
Hitchhike	1	3	2	1	1	1	0	2	1.87
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	4.31 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

At Santa Barbara, where bicyclists have increased the most , from 26% of all students in 1965-66 to 58% in 1971-72, they have slowly replaced all other transportation modes. As shown in Table 75, the percent of students walking to campus at Santa Barbara decreased from 33% to 19% in six years, auto-oriented students decreased from 35% to 20%, and motorcycle and public transportation use decreased from 6% to 2%.

5. A clear interrelationship exists between the distance of student housing from campus and student travel modes.

As shown in Tables 8 and 9, a student's transportation mode directly correlates with the distance of his residence from campus. For students living within one mile of campus, walking is the preferred mode of movement--54% of all University of California students living within one mile of campus walk to campus while another 30% bicycle. Among students living 1 to 2 miles of campus, bicycling is the most popular--40% of students living to 2 miles of campus bicycle to campus. Among students living 3 to 5 miles from campus, motorcycles and motorscooters, as well as public transportation, are popular means of transportation; 5% use motorcycles/scooters and 16% use public transit.

6. Increasing residential distance directly correlates with an automobile orientation.

The farther a student lives from the campus the greater the chance he will use an automobile to get to campus. As illustrated in Tables 8 and 9, of the students living 3 to 5 miles of campus, 51% drive and another 13% are either car passengers or arrive in car pools--for a total car use by 64% of students; at 6 to 10 miles total car use increases to 83% of all students; at 11 to 12 miles it increases to 90%; and for students living more than 20 miles from campus, 95% of them use cars.

TABLE 10

STUDENT TRANSPORTATION MODES BY MEAN DISTANCE IN MILES OF STUDENT RESIDENCE FROM CAMPUS

All campuses
1971-72

	Mean Distance in Miles							
Campus	Car Driver	Car Passen.	Car Pool	Motor Scooter	Bicycle	Public Trans.	Walk	Average Distance
Berkeley[a]	9.74	6.30	11.90	4.01	1.46	5.95	0.60	3.31
Davis	7.39	3.12	7.21	2.53	0.86	1.89	0.72	2.22
Irvine	9.61	5.03	11.56	7.94	1.26	--	0.31	7.71
Los Angeles	10.53	7.70	10.30	4.93	1.99	6.00	0.39	6.73
Riverside	8.10	5.05	10.10	4.45	1.09	4.98	0.37	4.73
San Diego	8.10	3.57	9.76	6.08	2.07	2.42	0.28	5.55
San Francisco[b]	8.40	5.28	8.04	3.00	1.09	5.79	0.41	3.66
Santa Barbara[c]	9.02	9.07	11.50	4.63	0.77	6.84	0.73	2.57
Santa Cruz	6.59	7.45	6.12	3.69	2.58	1.87	0.31	3.29
University-wide Average	9.42	5.50	10.27	4.58	1.12	4.71	0.61	4.31

[a] At Berkeley, the average distance for hitchhiking was 1.10 miles.

[b] At San Francisco, the average distance for hitchhiking was 8.50 miles.

[c] At Santa Barbara, the average distance for hitchhiking was 9.68 miles.

TABLE 11

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE

University-Wide

1965-66, 1967-68, 1969-70, and 1971-72

VEHICLE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students			91,890	100%	103,524	100%	105,171	100%
Car	Not Available		53,233	58%	61,398	59%	61,362	58%
Motor Scooter or Cycle			3,694	4	4,482	4	3,310	3
Bicycle			21,743	24	26,279	26	40,413	38
None			26,074	29	27,888	27	24,897	24
TOTAL			105,751	115%	120,047	116%	129,982	123%
(Keep Both Car and Bicycle)			(13,861)	(15%)	(16,523)	(16%)	(24,811)	(23%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

7. Each different transportation mode has a correspondingly different "mean distance" of average travel.

As measured by average distance traveled, and as shown in Tables 8 and 9, among all University students, walkers lived on an average of 0.6 miles from campus, bicyclists 1.1 miles, those using public transit 4.7 miles, auto-passengers lived on an average of 5.5 miles from campus, while car drivers lived an average distance of 9.4 miles from campus and car pool users lived 10.3 miles.

The average (mean) distance of residence from campus was 4.3 miles for all 105,171 University students. The modal distance was 1 to 2 miles--that is approximately one-half of all University students lived less than two miles from campus, while the remaining one-half lived three or more miles from campus.

B. VEHICLES KEPT AT STUDENT RESIDENCE

1. Most students own cars or bicycles.

University-wide, in 1971-72, three out of five students kept cars, two out of five students kept bicycles, one out of five students kept a car and a bicycle, and one out of five students did not own any vehicle. Table 11 shows the percentage of students keeping vehicles at their campus residences.

2. Because bicycle ownership has increased so much in the past few years, more students now keep both a car and a bicycle.

University-wide, in 1967-68, one out of seven students kept both a car and a bicycle; in 1971-72, nearly one out of four students kept both. At the bicycle-oriented campuses more than one-third of all students kept both cars and bicycles in 1971-72.

TABLE 12

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

University-wide

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	21,715	28,687	15,858	12,580	9,898	10,051	6,382	105,171	4.31
Car	7,180	14,532	9,876	9,330	7,513	7,837	5,094	61,362	5.05
Motor Scooter or Cycle	382	637	687	734	442	312	116	3,310	4.19
Bicycle	9,846	12,942	8,851	4,052	2,209	1,632	881	40,413	2.26
None	7,591	7,402	2,325	2,142	1,929	2,168	1,340	24,897	3.97
TOTAL	24,999	35,513	21,739	16,258	12,093	11,949	7,431	129,982	
(Keep Both Car and Bicycle)	3,284	6,826	5,881	3,678	2,195	1,898	1,049	24,811	3.43

Source: University of California, Office of the Assistant Vice President—Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 13

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

University-wide

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	21,715	28,687	15,858	12,580	9,898	10,051	6,382	105,171	4.31
Car	33%	51%	62%	74%	74%	74%	80%	58%	5.05
Motor Scooter or Cycle	2	2	4	6	5	3	2	3	4.19
Bicycle	45	45	56	32	23	18	14	38	2.26
None	35	26	15	17	20	24	21	24	3.97
TOTAL	115%	124%	137%	129%	122%	119%	117%	123%	
(Keep Both Car and Bicycle)	(15%)	(24%)	(37%)	(29%)	(22%)	(19%)	(17%)	(23%)	3.43 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning. Student Housing and Transportation Survey, 1971-72.

3. The most interesting change in student-vehicle ownership patterns has been the doubling in bicycle ownership.

As shown in Table 11, nearly twice as many students owned bicycles in 1971-72 (38%), as in 1967-68 (24%).

4. Over time, the percentage of students owning cars has stayed the same.

As shown in Table 11, 58% of all students owned cars in 1967-68; again, in 1971-72, 58% did so.

As a consequence of the above two trends, growing bicycle ownership and stable car ownership, bicycle ownership is becoming almost as common as car ownership among University students.

5. The probability of a student keeping a vehicle correlates with distance the student lives from campus.

Students living closer to campus tend to keep bicycles (as illustrated in Tables 12 and 13). Bicycle ownership is highest among students living within two miles of campus--45% of on-campus students, 45% of students living within one mile of campus, and 56% of students living within two miles keep bicycles. Bicycle ownership is less popular among students living further from campus--only 32% of students living three to five miles from campus have bicycles.

By comparison, the percentage of students owning automobiles generally increases as students live farther from campus. Seventy-four percent of students living 6 to 10 miles and 11 to 20 miles have cars, as do 80% of students living more than 20 miles from campus.

6. Bicycle ownership is more evenly distributed throughout the student population than car ownership.

Any campus effort to encourage bicycle use will have an equatable effect on all students whereas campus efforts designed to encourage automobile use will more likely affect the choice of transportation modes of graduate students more than undergraduate students, married students more than single students, and men more than women.

a. The percentage of students owning bicycles decreases with academic class standing while the percentage of students owning cars increases with class standing. As shown in Table 14, bicycles are owned by 44% of lower-division students, 40% of upper-division students and 31% of graduate students. Cars are owned by 37% of lower-division students, 60% of upper-division students and 78% of graduate students.

b. The probability of a student keeping a car or bicycle varies with a student's marital status. University-wide, the percentage of students owning bicycles is slightly higher among single (40%) students than married (35%) students, while the percentage of students owning cars is about twice as high among married students as single students; 51% of single students and 82% of married students own cars. (Because a car is frequently shared by a married couple, the per person ownership rates among married students and single students is actually not very different.)

c. There are also vehicle ownership differences based upon the sex of the student. Women are somewhat more likely to own bicycles than men, but men own considerably more cars than women; 36% of men and 43% of women own bicycles, while 65% of men and 45% of women own cars.

C. VEHICLE USE

1. The probability that a student will make daily use of the vehicle

he owns is linked closely with the dominant transportation orientation of the campus he attends.

As illustrated in Table 6, at the bicycle-oriented campuses, students are more likely to use the bicycles they own than the cars they own as their transportation to campus; at the automobile-oriented campuses, students are more likely to use the cars they own than the bicycles they own as transportation to campus; and at the pedestrian-oriented campuses, students are more likely to leave their vehicles at their residences than use either car or bicycle for transportation to campus.

For example, as shown in Table [illegible], at Davis, a bicycle-oriented campus, 78% of students who own bicycles use bicycles, for transportation to campus, but only 30% of students who own cars cars. At Irvine, an automobile-oriented campus, the situation is just the reverse--89% of students who own cars use cars for transportation to campus, while 19% of students who own bicycles use bicycles. At Berkeley, a pedestrian-oriented campus, 38% of the students who own cars use cars and 41% of students who own bicycles use bicycles.

2. Transportation modes are influenced by the average distances most students live from campus.

Thus, as shown in Table 10, Davis has a high probability of bicycle use partly because of a high percentage of students at Davis (87%) live within two miles of campus--the mean distance at which bicycles are most popular. Similarly Irvine has a high probability of car use partly because a large proportion of students at Irvine (66%) live over three miles from campus--a distance which correlates with high automobile use.

TABLE 14

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY CLASS STANDING, BY MARITAL STATUS AND BY SEX

University-wide

1971-72

VEHICLE	CLASS STANDING			MARITAL STATUS		SEX		ALL STUDENTS
	L. D.	U. D.	Grad.	Single	Married	Male	Female	
Number of Students	31,909	43,291	29,971	83,879	21,292	63,160	42,011	105,171
Car	37%	60%	78%	51%	82%	65%	45%	58%
Motor Scooter or Cycle	2	4	4	3	5	4	1	3
Bicycle	44	40	31	40	35	36	43	38
None	33	22	17	27	13	21	30	24
TOTAL	116%	126%	130%	121%	135%	126%	119%	123%
(Keep Both Car and Bicycle)	(16%)	(26%)	(30%)	(21%)	(35%)	(26%)	(19%)	(23%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

3. Students at bicycle-oriented campuses are more likely to use the bicycles they own and students at automobile-oriented campuses are more likely to use the automobiles they own, regardless of the distance the student lives from campus.

For example, 38% of students at Irvine (an automobile-oriented campus) who own cars and live within one mile of campus use their cars for transportation to campus while only 5% of students at Davis (a bicycle-oriented campus) who own cars and live within one mile of campus use their cars for transportation to campus. By contrast, only 21% of students at Irvine who own bicycles and live within one mile of campus use their bicycles for transportation to campus while 74% of students at Davis who own bicycles and live within one mile of campus use their bicycles for transportation to campus.

This suggests that campus policy to encourage the use of particular transportation mode will be of varying effectiveness on each campus depending on its dominant transportation mode.

4. The probability that a car owner will use his car, and a bicycle owner his bike, is identical on a University-wide basis.

In general, as shown in Table 15, for the University as a whole, in 1971-72, 58% of students owned cars and 32% of students drove cars. Therefore, the probability that a car owner would drive his car was 0.55 (e.g., 55%). Similarly, 38% of students owned bicycles and 21% of the students used bicycles. Therefore, the probability that a bicycle owner would use his bicycle was also 0.55 (e.g., 55%).

TABLE 15

PROBABILITY OF VEHICLE OWNERS USING THEIR VEHICLES FOR TRANSPORTATION TO CAMPUS

University-wide

1971-72

	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	Total/ Average
Number of Students	21,715	28,687	15,858	12,580	9,898	10,051	6,382	105,171
Percent who own cars	33%	51%	62%	74%	74%	74%	80%	58%
Percent who drive cars	11%	7%	22%	51%	68%	74%	79%	32%
Probability of car owners driving to campus	0.33	0.14	0.35	0.69	0.92	1.00	0.99	0.55
Percent who own bicycles	45%	45%	56%	32%	23%	18%	16%	38%
Percent who ride bicycles	26%	30%	40%	12%	3%	1%	0%	21%
Probability of bicycle owners riding to campus	0.58	0.67	0.71	0.38	0.25	0.06	0.00	0.55

[a] Estimated based on other campuses. Includes some students who drive cars owned by their families.

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

5. The highest probability of bicycle use is among students living short distances from campus.

Among on-campus students, there is a 0.58 (58%) probability that if a student owns a bicycle, he will use it; this probability increases to 0.67 (67%) for students living within one mile of campus; and increases again to 0.71 (71%) for students living within 1 to 2 miles. Beyond two miles, the probability of bicycle user decreases to less than 20%.

6. Among car owners, the probability that those living close to campus will use their cars is very low.

For example, although cars are owned by 51% of all University students living within one mile of campus (excluding those living on-campus), only 7% of the students living within one mile drove to campus. Thus, the probability of car use among this group was 0.14 (14%). Stated another way, 86% of cars owned by students living within one mile of campus are not used as a means of transportation to campus--they would be stored at the place of residence.

7. At greater distances from campuses the probability of a car owner using his car increases dramatically.

Of those students living 3 to 5 miles from campus and owning cars, there is a 0.69 (69%) probability that the car will be used; this probability increases to 0.92 (92%) at distances of 6 to 10 miles; and for students living more than 10 miles from campus, the probability that they will use the cars they own is 1.00. In other words, 100% probability.

Thus, to the extent that students have the opportunity and choose to live close to campus, there will be a decrease in car use, but not necessarily in car ownership.

VII. BERKELEY

A. SUMMARY

Berkeley has been classified as a pedestrian-oriented campus because in 1971-72 approximately half of the Berkeley students walked to the campus from their residence. One of the factors responsible for this orientation was the high proportion of students at Berkeley living within walking distance of the campus; three-fifths lived within a one-mile radius.

The factor distinguishing Berkeley from a campus such as Santa Barbara, which had an even greater percentage of students living within one mile yet had a bicycle orientation, seems to be the traffic congestion of the Berkeley environs, unrelieved by any comprehensive system of bike paths, plus the hilly Berkeley terrain.

The experience of other campuses, such as Irvine and San Diego, shows that if there are not any policies prohibiting driving, that many students living within one mile of campus drive rather than walk while Berkeley students walk because driving is impractical. The traffic congestion on the city streets makes parking and driving difficult, while the campus itself has a strict parking policy, with parking permits issued only to those students who show medical necessity. Auto access to the campus is also limited in contrast to the numerous campus entrances for pedestrians.

In addition, classroom buildings at Berkeley are in close proximity to one another, and there are many goods and services available in shopping areas next to the campus, so once a student arrives on campus walking is the most convenient way to get around.

Among students living 1 or 2 miles from the Berkeley campus, bicycling was less popular than walking, but bicycles were used more often than cars at this distance. Between 3 and 5 miles from campus bicycle popularity had grown at the expense of both walking and driving. In fact increased bicycle use resulted in significant decline in the number of pedestrians over the six years surveyed. (The other apparent shift, from walking to hitchhiking, was probably just a change in labels, occurring since the "hitchhike" category was added to the survey form in 1971.)

At distances between 3 and 10 miles from campus, public transportation reached its peak, being used by about one-fifth of the students surveyed. However, although it is readily accessible, public transit has on the average not been heavily used by Berkeley students, perhaps because of the high concentration of students (67%) living within two miles of campus.

Among students living beyond five miles of campus, automobile popularity jumped, and bicycle use became almost negligible.

Half of the students at Berkeley owned cars in 1971-72, an ownership rate which remained relatively stable since 1965-66 (the first year of the survey). More important than the stable ownership rates, was that less than 40% of those who did own cars used them to get to campus.

By comparison, while only three out of ten students owned bicycles in 1971-72, that figure was double what it had been just six years earlier when 15% of the students owned bicycles. Again, only 40% of the bicycle owners actually rode bikes to campus. This low usage of vehicles is one of the hallmarks of the pedestrian campus--the students own vehicles (both cars and bicycles) but they do not use them for transportation to campus.

The probability that students who owned bicycles would use them, however, fluctuated with distance from campus. Close to campus there was a high probability that bicycle owners would ride their bikes, while the probability was extremely low that car owners would drive. At greater distances from campuses (three or more miles) the opposite was true; students would be less likely to bicycle, while most of the car owners used their vehicles for transportation.

Therefore, although there has been both a stabilization and even a decrease in the percentages of students at any given distance who drive cars, the trend of Berkeley students to live at greater distance from campus may result in an increase in the numbers of cars being brought to the campus as Berkeley becomes more of a region-serving commuter campus.

Similarly, students living close to campus own significantly fewer cars than those living farther away, suggesting that off-street parking requirements for student housing be geared to reflect automobile ownership rates.

Three other variables which had an effect on student vehicle ownership were academic level, marital status, and sex. The greatest differences were noted in car ownership--graduate, men and married students were nearly twice as likely to own cars as undergraduates, women and single students. Bicycle ownership, however, was fairly consistent at about 30% for all these groups. Because of these differences, this suggests that a campus policy favoring one mode of transportation over another might benefit or disadvantage one group of students more than another. Similarly, changes in the academic level, marital status, or sex composition of the student body, such as increases in the numbers of women or undergraduate

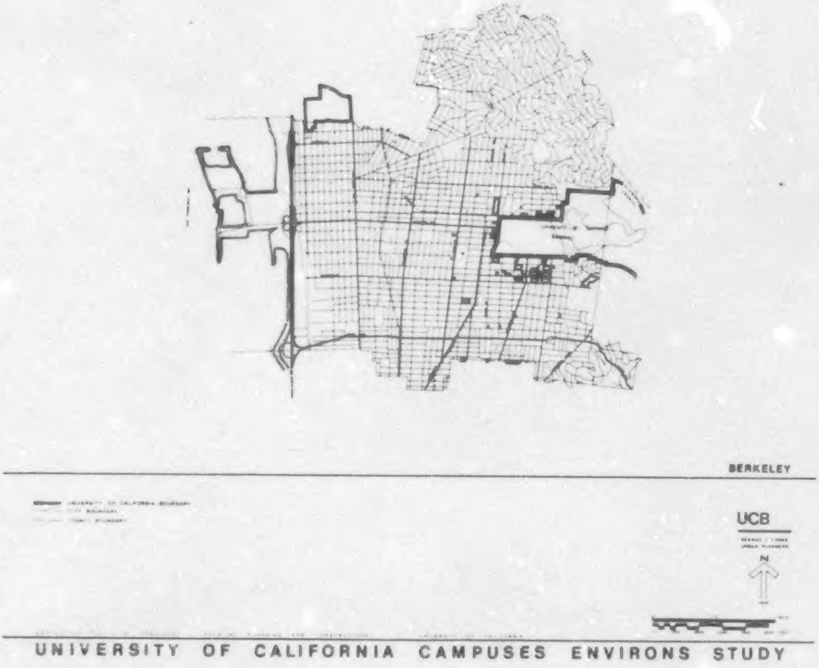
PHOTOGRAPH 1

BERKELEY CAMPUS, AERIAL VIEW, 1971

View looking east. Photograph by R. L. Copeland.

MAP 2

BERKELEY CAMPUS ENVIRONS


BERKELEY
UNIVERSITY OF CALIFORNIA BOUNDARY
CITY BOUNDARY
COUNTY BOUNDARY
UCB
N
UNIVERSITY OF CALIFORNIA CAMPUSES ENVIRONS STUDY

students, would probably affect the transportation patterns emphasizing bicycles more so than cars.

B. BACKGROUND

The Berkeley campus, as shown on Map 2 and in the aerial photograph, covers 1,238 acres including 200 acres of primary academic area and 50 acres acquired in adjacent and previously privately-owned residential areas to the south, west and north of the academic campus. The developed portions of the campus are in the City of Berkeley, the undeveloped in the City of Oakland. (Another University property is the Gill Tract in the nearby City of Albany, site of an agricultural experiment station and of the campus housing for married students.)

The University's Lawrence Berkeley Laboratory and other research facilities are in the hills to the east, close to single-family residences. Tilden Regional Park, a linear open buffer, extends along the ridgeline of the Berkeley-Oakland hills. Other major land uses near the campus include a 20-acre campus-oriented shopping area south of the campus, and the 80-acre central business district to the west where the nearest Bay Area Rapid Transit Station is located. Fraternity and other group dwellings cluster within four blocks north and south of the campus. The former area is undergoing change to theological school uses, while the latter is experiencing low-rise apartment construction. Applicable zoning provisions limit building height to three residential stories in these areas (permitted garages and penthouses often result in five-story buildings).

Competition for space near the campus, especially for commercial and office uses, has encouraged conversion or demolition of large homes.

This has increased off-street parking demands and intensified the student housing problem, particularly in the south campus area, where students and non-students compete for the same housing.

Zoning in the environs is predominantly medium to high residential densities. The Central Business District is a large block of C-2 commercial, while the Telegraph Avenue area is a small C-1 commercial zone. Residential densities (50 to over 100 dwelling units net acre) are highest near the campus and decrease toward the environs boundaries. In the medium-density (10-49 du/net acre) areas, group dwellings as well as apartment buildings are permitted.

C. TRANSPORTATION ORIENTATION

In the typology developed in this study, Berkeley has been classified as a pedestrian-oriented campus because in 1971-72 approximately half of the Berkeley students walked to campus.

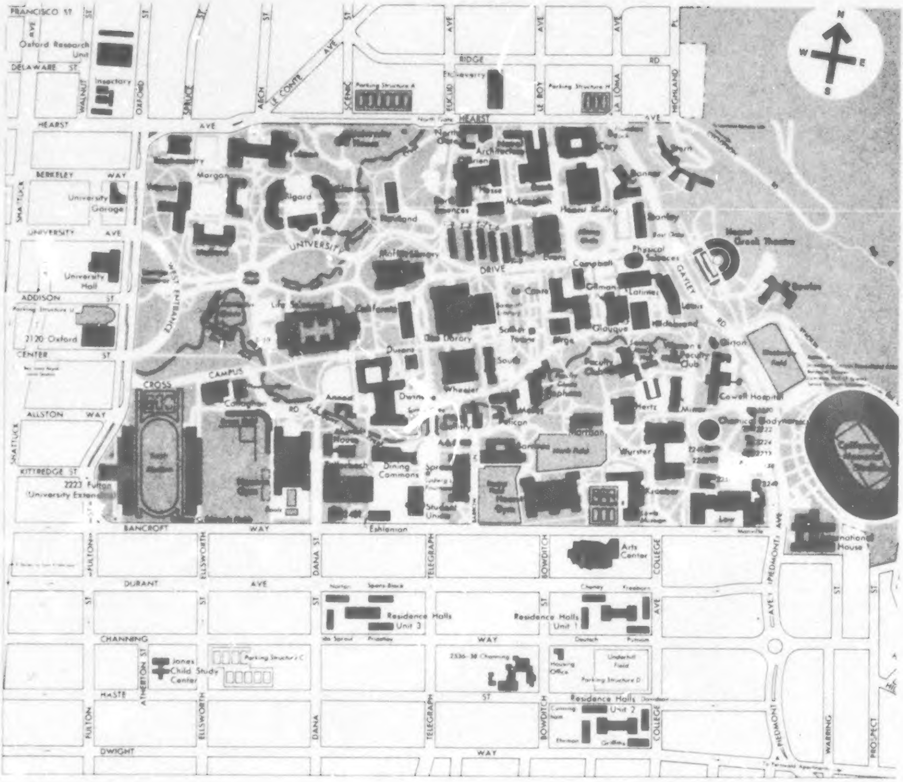
Both the campus and its environs have a number of features which make the campus convenient for pedestrians and inconvenient for drivers.

First, the Berkeley campus has a high concentration of students living in close proximity to the campus. In 1971-72, 59% of the 27,119 students lived on-campus or within one mile of campus, and 74% of students lived within two miles of campus.

Second, the density of the immediate campus environs creates serious traffic and parking problems which discourage students who live in close proximity from driving to campus. (Students who live more than 1 to 2 miles from campus and drive must park their cars on streets within 1 or 2 miles of campus and then walk because there is no on-campus parking for students.)

MAP 3

BERKELEY CAMPUS

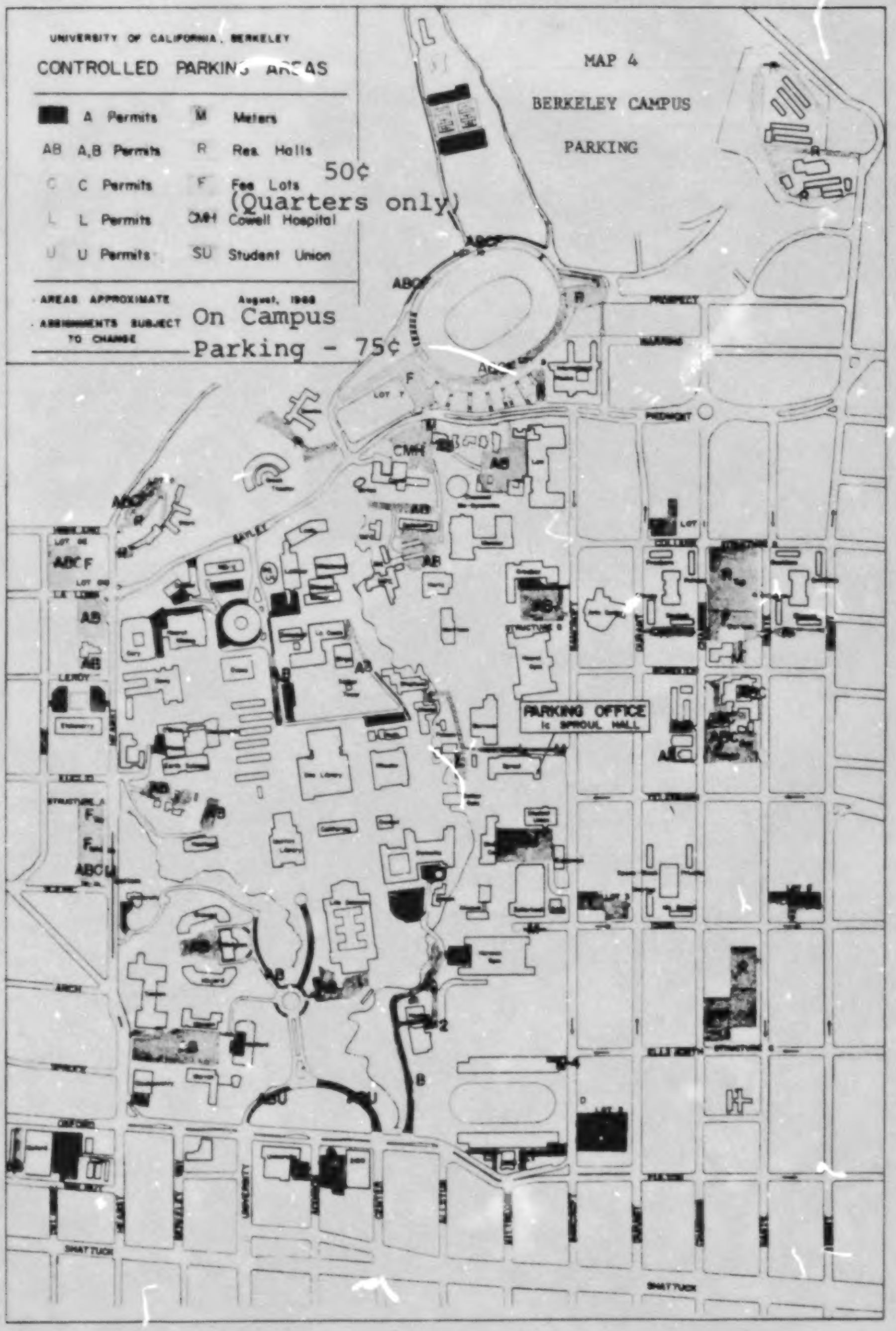

N
W
E
S
FRANCISCO ST
Oxford Research Unit
DELAWARE ST
Insectary
WALNUT
OXFORD
SPRUCE
ARCH
LE CONTE AVE
SCENIC
Parking Structure A
EUCLID
RIDGE
LE ROY
Parking Structure H
LA LOMA
HIGHLAND
HEARST AVE
BERKELEY WAY
University Garage
SHATTUCK
UNIVERSITY AVE
University Hall
ADDISON ST
2120 Oxford
CENTER ST
ALLSTON WAY
KITTREDGE ST
2223 Fulton University Extension
CROSS CAMPUS RD
WEST ENTRANCE
UNIVERSITY DRIVE
Morgan
Hilgard
Haviland
Life Sciences
California
Architecture
Hesse
McLaughlin
Hearst Mining
Cory
Stern
Greek Theatre
Bowles
Evans
Campbell
Physical Sciences
Gilman
Latimer
Hildebrand
Giauque
Le Conte
Birge
Girton
Faculty Club
Doe Library
South
Durant
Wheeler
Dwinelle
Cowell Hospital
Hertz
Wurster
Kroeber
Law
California Memorial Stadium
Dining Commons
Student Union
Eshleman
BANCROFT WAY
International House
Arts Center
DURANT AVE
Residence Halls Unit 3
Residence Halls Unit 1
CHANNING WAY
Jones Child Study Center
Parking Structure C
2336-50 Channing
Housing Office
Underhill Field
Parking Structure D
HASTE ST
Residence Halls Unit 2
DWIGHT WAY
FULTON
ELLSWORTH
ATHERTON
DANA
TELEGRAPH
BOWDITCH
COLLEGE
PIEDMONT AVE
WARRING
PROSPECT

Third, as shown in Map 2, the community--with the Sather Gate-Telegraph Avenue shopping district, the Euclid-Northside shopping area, and downtown commercial area--provides a variety of goods and services in close proximity to campus. This means students who live on or near campus can walk to reach their shopping, as well as some employment and recreation.

Finally, as shown in Map 3 and on the aerial photo of the campus, the design of the campus and subsequent campus policies encourage a pedestrian orientation. The campus has more than 20 entry points, most of which are accessible only by pedestrians, and campus buildings are located within easy walking distance of one another. Also, campus policy discourages the student (and staff) use of cars. For example, both because of the high cost of constructing parking structures on campus and the sentiment that walking should be encouraged, the campus provides only a small number of parking spaces for students and staff in comparison to other campuses.

As shown in the parking location Map 4, in 1971-72, the campus provided approximately 16 parking spaces per 100 campus student, faculty and staff population. (University-wide, the campuses provided an average of 33 parking spaces per 100 campus population.) Students at Berkeley are denied parking permits unless they have a medical reason for driving to campus.

Both the setting of the campus in a congested area which offers a variety of goods and services within convenient walking distances, and the policies of the campus administration to discourage the use of cars and to make the campus an attractive place for pedestrians have encouraged students to walk to and from campus.


UNIVERSITY OF CALIFORNIA, BERKELEY
CONTROLLED PARKING AREAS
A Permits
AB A,B Permits
C C Permits
L L Permits
U U Permits
M Meters
R Res. Halls
F Fee Lots
CMH Cowell Hospital
SU Student Union
50¢
(Quarters only)
AREAS APPROXIMATE
ASSIGNMENTS SUBJECT TO CHANGE
August, 1968
On Campus
Parking - 75¢
MAP 4
BERKELEY CAMPUS
PARKING
PARKING OFFICE
1c SPROUL HALL
PROSPECT
PIEDMONT
SHATTUCK

D. TRANSPORTATION MODES

1. The mean (average) distance of all student residences from campus was 3.31 miles, while the modal distance was 1 to 2 miles.

As shown in Tables 16 and 17, in 1971-72, 16,000 students (59% of the enrollment) lived on-campus or within one mile of campus; 4,068 (15%) lived within 1 to 2 miles of campus; 2,712 (10%) lived within 3 to 5 miles; and 4,339 (16%) lived six or more miles from campus.

2. Walking is the preferred mode of transportation among the students on the Berkeley campus.

As illustrated in Tables 16, 17 and 18, in 1971-72, approximately one-half of Berkeley's students walked, one-fourth of the students used automobiles (were car drivers, car passengers, or in car pools), one-eighth used bicycles, and one-eighth used other modes of transportation to campus--primarily public transit.

As noted in the previous section, and as detailed in Tables 16 and 17, one of the chief factors affecting the pedestrian travel orientation of the Berkeley campus has been the high concentration of students living on campus and within one mile of campus. Of the 16,000 students living within a one-mile radius of the Berkeley campus in 1971-72, 11,731 (73%) walked to campus.

3. Berkeley campus students who bicycled generally lived within two miles of campus.

In 1971-72, nearly 3,300 (12% of all students) bicycled to campus daily. Of these bicyclists, 1,621 lived off-campus but within one mile (13% of 12,475), while another 976 lived between one and two miles of campus (24% of 4,068). The effect on the use of vehicles as measured by

TABLE 16

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Berkeley Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	3,525	12 [illegible]	[illegible],068	2,712	1,356	1,627	1,356	27,119	3.31
Car Driver	106	499	651	1,139	854	1,090	1,030	5,369	9.74
Car Passenger	71	125	122	163	81	98	68	728	6.30
Car Pool	0	0	41	82	54	114	81	372	11.90
Motor Scooter or Cycle	0	125	163	190	54	33	14	579	4.01
Bicycle	211	1,622	976	407	41	16	0	3,273	1.46
Public Transportation	106	374	407	515	258	260	163	2,083	5.95
Walk	2,749	8,982	1,423	108	0	0	0	13,262	.60
Hitchhike	282	748	285	108	14	16	0	1,453	1.10
TOTAL	3,525	12,475	4,068	2,712	1,356	1,627	1,356	27.119	3.31

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 17

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Berkeley Campus

1971-72

	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								
TRANSPORTATION MODE	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	3,525	12,475	4,068	2,712	1,356	1,627	1,356	27,119	3.31
Car Driver	3%	4%	16%	42%	63%	67%	76%	20%	9.74
Car Passenger	2	1	3	6	6	6	5	3	6.30
Car Pool	0	0	1	3	4	7	6	1	11.90
Motor Scooter or Cycle	0	1	4	7	4	2	1	2	4.01
Bicycle	6	13	24	15	3	1	0	12	1.46
Public Transportation	3	3	10	19	19	16	12	8	5.95
Walk	78	72	35	4	0	0	0	49	0.60
Hitchhike	8	6	7	4	1	1	0	5	1.10
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	3.31 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

distance of residence of students from campus in 1971-72 is shown in Tables 16 and 17.

4. Although 5,700 cars were driven to campus daily, 75% were driven by students living three or more miles from campus.

In 1971-72, 7,051 (26% of the total student population) lived three or more miles from campus; these students accounted for 4,854 cars being driven to campus daily. Of the 2,712 students living 3 to 5 miles from campus, 1,384 (42%) came to campus in cars--1,139 drove and another 245 came in car pools or as car passengers;[1] of the 4,339 students living six or more miles from campus, 3,470 (80%) came to campus in cars--2,974 drove and another 496 came in car pools or as car passengers.

5. In addition to the easy pedestrian access to campus, and the substantial use of bicycles (12%) and cars (24%) by students, ten different public transit routes connect the Berkeley campus with its environs and with the Bay Area.[2]

However, because of the high numbers of students living close to campus and walking, the demand for public transportation was not high and was used in 1971-72 by only 8% of the total student population. As shown in Tables 16 and 17, the use of public transportation was most popular among students living between 3 and 10 miles from campus--1 out of 5 students living at these distances used public transportation. Among

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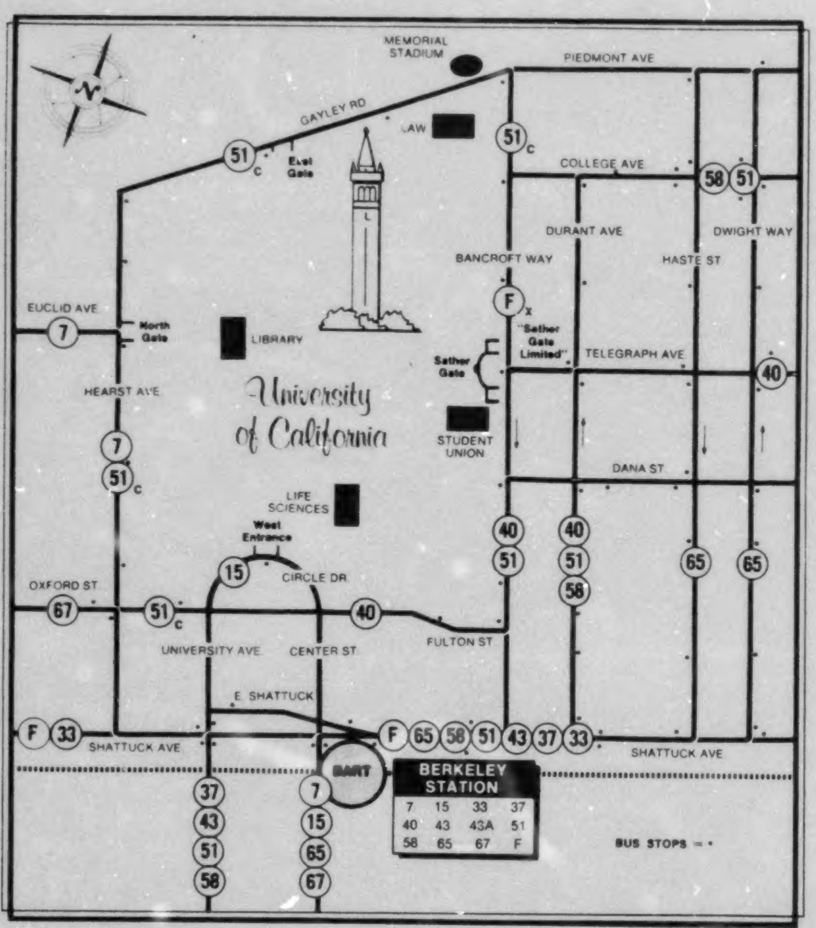
[1] The actual number of cars coming to campus would be somewhat less than the number arriving by car. At a maximum, there would be one car for every two persons who stated they were car passengers, or arrive in car pools.

[2] The Bay Area Rapid Transit system (BART) did not begin operating in the East Bay until late 1972, after this survey data was accumulated.

MAP 5

PUBLIC TRANSIT ROUTES, BERKELEY


N
MEMORIAL STADIUM
PIEDMONT AVE
GAYLEY RD
LAW
51 C
East Gate
COLLEGE AVE
58
51
DURANT AVE
DWIGHT WAY
BANCROFT WAY
HASTE ST
EUCLID AVE
7
North Gate
LIBRARY
F X
"Sather Gate Limited"
Sather Gate
TELEGRAPH AVE
40
HEARST AVE
University of California
STUDENT UNION
DANA ST
LIFE SCIENCES
West Entrance
15
CIRCLE DR
65
OXFORD ST
67
40
UNIVERSITY AVE
CENTER ST
FULTON ST
E. SHATTUCK
F
33
SHATTUCK AVE
F 65 58 51 43 37 33
BART
BERKELEY STATION
7 15 33 37
40 43 43A 51
58 65 67 F
37 43 51 58
7 15 65 67
BUS STOPS = •

students living eleven or more miles from campus, 1 out of seven used public transit. Map 5 shows the public transit routes which connect with the campus.

6 In spite of its near invisibility, hitchhiking appears to be a common phenomenon in Berkeley, and is an important means of transportation to campus for students.

In 1971-72, 5% of all students hitchhiked to campus. Most hitchhiking was of distances of two miles or less. As shown in Tables 16 and 17, one out of fifteen students living within two miles hitchhiked to campus.

7. The most significant change in the travel modes of Berkeley students during the period 1965-66 to 1971-72 was the substantial decrease in the number of students walking to campus and the corresponding increase in the number of students driving, bicycling, and coming to campus in public transit.

A shown in Table 18, in the six years from 1965-66 to 1971-72, the enrollment at Berkeley increased from 26,378 to 27,119. In 1965-66, 16,354 students (62% of the student population of 26,378) walked to campus, but in 1971-72 only 13,262 students (49% of the student population of 27,119) did so--a decline of 3,092 pedestrians.

During this time, the number of students bicycling to campus increased by 1,426 students--from 1,847 in 1965-66 (7% of the student population) to 3,273 in 1971-72 (12% of the student population). Also. between 1965-66 and 1971-72 the number of students driving to campus increased by more than 900--from 4,484 in 1965-66 (17% of the student population) to 5,369 in 1971-72 (20% of the student population). The number arriving as car passengers or in carpools decreased from 1,319 (5%)

TABLE 18

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS

Berkeley Campus

1965-66, 1967-68, 1969-70, and 1971-72

TRANSPORTATION MODE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students	26,378	100%	27,957	100%	27,846	100%	27,119	100%
Car Driver	4,484	17%	5,312	19%	5,569	20%	5,369	20%
Car Passenger	791	3	839	3	835	3	728	3
Car Pool	528	2	280	1	278	1	372	1
Motor Scooter or Cycle	1,055	4	1,118	4	835	3	579	2
Bicycle	1,847	7	1,677	6	1,950	7	3,273	12
Public Transportation	1,319	5	1,677	6	1,950	7	2,083	8
Walk	16,354	62	17,054	61	16,429	59	13,262	49
Hitchhike	--	NA	--	NA	--	NA	1,453	5
TOTAL	26,378	100%	27,957	100%	27,846	100%	27,119	100%

Source: University of California, Office of the Assistant Vice President—Physical Planning, Student Housing and Transportation Survey, years indicated.

to 1,100 (4%). Although the actual number of students driving to campus has increased slightly, it also has remained consistent at about 20% of students since 1969-70. Thus, as the campus enrollment stabilizes around a target enrollment of 27,500 students, so should the number of car drivers.

8. The changes in the number of students walking, bicycling and driving to campus during the period 1965-66 to 1971-72 resulted from three interrelated factors:

First, the percent of students living within two miles of campus decreased slightly; second, a shift occurred in student travel habits, from walking to bicycling among students living within two miles of campus, and from driving to bicycling among students living three to five miles from campus; and third, there was a slight increase in the number of students enrolled.

9. The major factor affecting the decrease in the number of students walking to campus and the increase in the number of students bicycling and driving to campus was the decrease in the number of students living within two miles of campus and the growth in the number of students living three or more miles from campus.

Between 1965-66 and 1971-72, the percent of students living within two miles decreased from 79% to 74% (from 20,839 students to 20,068 students) while the percentage of students living three or more miles from campus increased from 21% to 26% (from 5,539 to 7,051 students). Because Berkeley students living three or more miles from campus were more inclined to drive their cars to campus than students living closer to campus, the increase in the number of students living three or more miles from campus meant an increase in the number of students driving cars to campus. Only one out of ten students within two miles of campus drove, but six out of ten students living three or more miles from campus drove.

10. Marked changes in student travel habits occurred in the period, 1965-66 to 1971-72.

For example, the percent of students bicycling to campus remained constant at 6% to 7% from 1965-66 to 1969-70, but grew from 7% to 12% between 1969-70 and 1971-72. Much of this change can be attributed to an increased ecological awareness among students, a desire to exercise while traveling to campus, and the establishment by the City of Berkeley of bicycle lanes on streets adjacent to the Berkeley campus (see Map 6). As a result, students living within two miles of campus changed their travel mode from walking to bicycling to campus and some students living within 3 to 5 miles from campus shifted from driving to bicycling to campus.

TABLE 19

PREFERRED MODE OF TRANSPORTATION FOR STUDENTS
LIVING CLOSE TO THE BERKELEY CAMPUS

1971-72

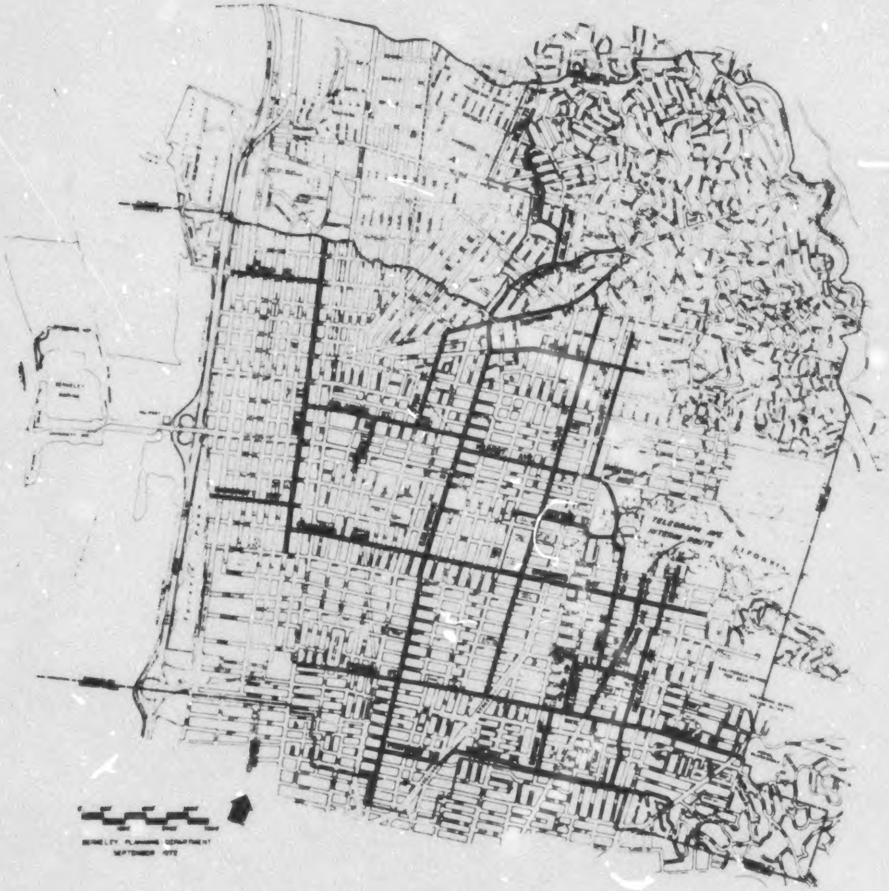
Distance:	Live within 1 mile		1 to 2 miles		3 to 5 miles	
Mode:	Walk	Bicycle	Walk	Bicycle	Walk	Bicycle
1969-70	87%	6%	47%	15%	48%	7%
1971-72	72%	13%	35%	24%	42%	15%
Change	-15%	+7%	-12%	+9%	-6%	+8%

MAP 6

CITY OF BERKELEY BIKEWAYS

BERKELEY BIKEWAYS

PHASE 1


TELEGRAPH AVE
INTERIM ROUTE
CALIFORNIA
BERKELEY PLANNING DEPARTMENT
SEPTEMBER 1972

As shown in Table 19, between 1969-70 and 1971-72, among students living within one mile of campus, the percentage of students bicycling to campus increased from 6% to 13%; among students living 1 to 2 miles from campus, the percentage increased from 15% to 24%, and among students living 3 to 5 miles from campus the percentage increased from 7% to 15%. At the same time, among students living within one mile of campus, the percent of students walking to campus decreased from 87% to 72%, and among students living within one or two miles from campus, the percent of students walking to campus decreased from 47% to 35%. As a result of the increased use of bicycles among students living within three to five miles from campus, the percent of students driving cars to campus decreased from 48% to 42%.

11. There was a slight increase in the number of students enrolled; enrollment grew from 26,378 in 1965-66 to 27,119 in 1971-72.

E. VEHICLE OWNERSHIP

1. Vehicle ownership among Berkeley students is similar to University-wide averages.

In 1971-72, and as illustrated in Tables 21 and 22, approximately 5 out of 10 Berkeley students kept cars, 3 out of 10 students kept bicycles and 3 out of 10 did not own any vehicles at all (in addition, nearly 2 out of 10 kept both a car and a bicycle).

2. The farther a student lived from campus, the greater the probability that he would keep a car

("Keep" a car presumably means exclusive use, but not necessarily ownership.) As shown in Table 20, 2 out of 10 students living in on-campus housing kept a car; 5 out of 10 students living off-campus but within one mile kept a car; 6 out of 10 students living 1 to 2 miles kept a car; and

TABLE 20

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Berkeley Campus
1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	3,525	12,475	4,068	2,712	1,356	1,627	1,356	27,119	3.31
Car	811	5,863	2,400	2,034	1,058	1,220	1,058	14,444	4.57
Motor Scooter or Cycle	70	250	163	108	27	32	0	650	2.37
Bicycle	740	3,867	1,627	922	285	277	271	7,989	2.62
None	2,080	4,366	854	407	230	342	271	8,550	2.21
TOTAL	3,701	14,346	5,044	3,471	1,600	1,871	1,600	31,633	
(Keep Both Car and Bicycle)	176	1,871	976	759	244	244	244	4,514	3.70

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 21

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Berkeley Campus

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	3,525	12,475	4,068	2,712	1,356	1,627	1,356	27,119	3.31
Car	23%	47%	59%	75%	78%	75%	78%	53%	4.57
Motor Scooter or Cycle	2	2	4	4	2	2	0	2	2.37
Bicycle	21	31	40	34	21	17	20	29	2.62
None	59	35	21	15	17	21	20	32	2.21
TOTAL	105%	115%	124%	128%	118%	115%	118%	116%	
(Keep Both Car and Bicycle)	(5%)	(15%)	(24%)	(28%)	(18%)	(15%)	(18%)	(16%)	3.70 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

nearly 8 out of 10 students living three or more miles from campus kept a car.

3. While the percentage of students keeping cars stayed about the same over the six-year period, 1965-66 to 1971-72, the percentage of students who kept bicycles nearly doubled in just the two-year period, 1969-70 to 1971-72.

As noted in Table 22, in 1965-66, 51% of students kept cars and 15% kept bicycles; this pattern changed little so that in 1969-70, 54% of students kept cars and 16% kept bicycles. However, by 1971-72, 53% of students kept cars while the percentage who kept bicycles increased to 29%. This increase in bicycle ownership from 16% to 29% meant that the number of students who kept bicycles jumped from 4,455 to 7,865 in two years.

4. The percentage of students keeping bicycles remained the same whether the student was lower-division, upper-division, or graduate; married or single; male or female.

This is described more fully in Table 23 which provides a percentage listing of student vehicles kept at student residences as measured in terms of class standing, marital status, and sex.

5. Automobile ownership varied significantly with academic standing, marital status and sex.

Automobile ownership was higher among graduate students (71%) than upper-division students (53%), and higher among upper-division students than lower-division students (34%). While almost twice as many married students than single students reported keeping cars (car ownership was 85%

TABLE 22

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE

Berkeley Campus

1965-66, 1967-68, 1969-70, and 1971-72

VEHICLE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students	26,378	100%	27,957	100%	27,846	100%	27,119	100%
Car	13,453	51%	14,538	52%	15,037	54%	14,444	53%
Motor Scooter or Cycle	1,055	4	1,118	4	835	3	650	2
Bicycle	3,957	15	4,193	15	4,456	16	7,989	29
None	10,287	39	10,624	38	10,303	37	8,550	32
TOTAL	28,752	109%	30,473	109%	30,631	110%	31,633	116%
(Keep Both Car and Bicycle)	(2,374)	(9%)	(2,516)	(9%)	(2,785)	(10%)	(4,514)	(16%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

and 45% respectively), car ownership per person may actually have been similar for single students and married students because married students tend to share the cars they own and single students do not.[3] Finally, car ownership varied by sex--for every five male students, three kept cars; but for every five female students, only two kept cars.

6. Because of the ease of owning a bicycle, many students who kept cars also kept bicycles.

Thus, the increased bicycle ownership has meant an increase in percentages of students keeping both cars and bicycles. As shown in Table 23, in 1965-66, 9% of Berkeley campus students (2,374) kept both bicycles and cars; by 1971-72, 16% of students (4,514) kept both bicycles and cars.

7. Despite the large numbers of Berkeley students who had one or two vehicles, a significant number did not have any vehicle.

Overall, as shown in Tables 22 and 23, in 1971-72, 32% of Berkeley students (8,550) had no vehicles. Among lower division students, 45% had no vehicles, among upper-division students, 30% did not, and among graduate students, 21% had neither a car nor a bicycle. By comparison, in 1965-66, 39% of the Berkeley students (10,287) did not have a vehicle. Thus, increased bicycle ownership occurred among students who previously did not have a vehicle, as well as among car owners.

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[3] Unpublished data from the study, New Apartments in the Berkeley Campus Environs: Their Student and Non-Student Occupants, Ira Stephen Fink and Albert Sukoff, University of California, Office of the Assistant Vice President--Physical Planning, 1973, indicates that among 106 married student families living within one mile of campus that 4% had no car, 68% had one car, and 28% had two cars. Average number of cars per family was 1.25.

TABLE 23

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY CLASS STANDING, BY MARITAL STATUS AND BY SEX

Berkeley Campus

1971-72

VEHICLE	CLASS STANDING			MARITAL STATUS		SEX		ALL STUDENTS
	L. D.	U. D.	Grad.	Single	Married	Male	Female	
Number of Students	7,051	11,119	8,949	21,425	5,694	17,085	10,034	27,119
Car	34%	53%	71%	45%	85%	60%	40%	53%
Motor Scooter or Cycle	2	3	2	3	2	3	1	2
Bicycle	30	30	28	29	32	29	31	29
None	45	30	21	36	11	27	40	32
TOTAL	111%	116%	122%	113%	130%	119%	112%	116%
(Keep Both Car and Bicycle)	(11%)	(16%)	(22%)	(13%)	(30%)	(19%)	(12%)	(16%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

F. VEHICLE USE

1. Despite high vehicle ownership among students, the probability that a student would use his or her car or bicycle as transportation to campus was lower at Berkeley than at campuses with non-pedestrian transportation orientations.

Although a student might own a bicycle or a car he would not necessarily use it as his daily means of transportation to campus. For example, in 1971-72, although 53% of the students at Berkeley kept cars and 29% kept bicycles, only 20% of the students drove to campus and only 12% bicycled to campus. This resulted in only a 38% probability that a student would use the car he or she kept for transportation to campus and a 41% probability that a student would use the bicycle he or she kept as transportation to campus.

2. The probability that a bicycle owner would use his bicycle to come to campus was highest at the shortest distances.

The probability that a bicycle or car owner would use the vehicle he or she owned, as measured by the distance of his residence from campus, is shown in Table 24. For example, among bicycle owners living 1 to 2 miles from campus, there was a probability of 0.60 (60%) they would use their bicycle to come to campus.

3. The probability that a student would use the car he or she owns increased the farther he or she lived from campus.

At Berkeley, in 1971-72, although cars were owned by nearly half the students living within one mile of campus (but not living on-campus), the probability of car use by this group was 0.09--that is less than 10% probability that a person owning a car and living within one mile of campus would use it for transportation to campus.

TABLE 24

PROBABILITY OF VEHICLE OWNERS USING THEIR VEHICLES FOR TRANSPORTATION TO CAMPUS

Berkeley Campus

1971-72

	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	Total/ Average
Number of Students	3,525	12,475	4,068	2,712	1,356	1,627	1,356	27,119
Percent who own cars	23%	47%	59%	75%	78%	75%	78%	53%
Percent who drive cars	3%	4%	16%	42%	63%	67%	76%	20%
Probability of car owners driving to campus	0.13	0.09	0.27	0.56	0.81	0.89	0.97	0.38
Percent who own bicycles	21%	31%	40%	34%	21%	17%	20%	29%
Percent who ride bicycles	6%	13%	24%	15%	3%	1%	0%	12%
Probability of bicycle owners riding to campus	0.29	0.42	0.60	0.44	0.14	0.06	0.00	0.41

[a] Estimated based on other campuses. Includes some students who drive cars owned by their families.

Source: University of California, Office of the Assistant Vice President--Physical Planning Student Housing and Transportation Surveys, 1971-72.

However, among the students living 11 to 20 miles from campus, the probability of their using the car was 0.89, or nearly 90% probability.

The significance of this low car use among students living close to campus has been further examined in a recent report on occupants of new apartments constructed since 1964 in the Berkeley campus environs. Of the more than 1,742 vehicles owned by the apartment dwellers, 1,100 were kept (stored) at the apartment each day;[4] of the 1,742 owned automobiles, 400 were parked on city streets.

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[4] See New Apartments in the Berkeley Campus Environs, op. cit., p. 30.

VIII. DAVIS

A. SUMMARY

Davis has been characterized as bicycle-oriented because in 1971-72 over one-half of its students used bicycles for transportation from their residence to the campus. One contributing factor was that 87% of the students at Davis lived within two miles of campus; this is easy biking distance because the terrain is quite flat and the low density of the campus environs reduces hazardous traffic congestion. In addition, classroom buildings are dispersed in such a way that walking from class to class is not as convenient as biking.

The most important factor contributing to high bicycle use is that the campus administration has made special efforts to encourage the use of bicycles. They have provided for a system of bike paths on campus, coordinated with bikeways on city streets. There is free bicycle parking near campus buildings, while the central portion of the campus is closed to cars, and parking permits for the lots around the periphery of the campus are fairly expensive. There is also a student bike patrol which helps the campus police to enforce traffic regulations as well as to recover stolen bicycles.

As a further discouragement to driving, the city has established a bus system which absorbs the student traffic on rainy days, when those who ride bicycles might otherwise turn to their cars. In general, public transportation has increased in popularity, incorporating a large number of former drivers and pedestrians. An additional--but fruitless--

attempt was made by the Davis student body and the City of Davis to establish a bike pool, with bikes that students could borrow and then leave for the next person, but the experiment ended in failure.

Bicycling has become so popular at Davis that within a two-mile radius of the campus almost three-quarters of the students used bikes as transportation in 1971-72, and of those who lived between three to five miles, a distance at which biking dropped off sharply at some other campuses, forty percent of the students still rode bicycles. The overall percentage of bike riders at the Davis campus has been slowly increasing, but because of an increased campus enrollment the actual number of bicyclists doubled in number between 1965-66 and 1971-72. Beyond five miles from campus, however, the dominance of the bicycle gave way to the car. Although a relatively small percentage of students lived that far from the campus, close to 100% of them used cars for transportation.

More students at Davis owned bicycles than cars, and were more likely to use the bikes they owned than the cars. Davis was also the most mobile of the campuses--a full 95% of the students owned some form of vehicle, whether automobile, bicycle, motorcycle or motorscooter.

Unlike most of the non-bicycle-oriented campuses, bicycle ownership at Davis showed fairly wide variations according to academic level, marital status and sex, in inverse proportion to variations in car ownership. Lower-division, women, and single students owned fewer cars and more bicylces than graduate, men, and married students. Apparently, the popularity of bicycles for transportation use, as opposed to recreation, was much more subject to these influences.

B. BACKGROUND

The Davis campus, with 3,772 acres, the largest in area of the nine University campuses, is located just outside the City of Davis. Most of the campus land is in Yolo County, while part is in Solano County to the south. The aerial photo of the campus illustrates that much of the campus is devoted to agricultural research and other non-urban activities such as primate research.

As shown in Map 7, the present campus core is located close to the heart of the City of Davis. Subdivisions recently annexed to the City stretch along the northern boundary of the campus. Between the center of the City of Davis core area and the eastern campus boundary is an eight-block area of mixed single-family, multi-family, and fraternity structures. A campus-related shopping center, University Mall, is located just north of the Anderson Road campus entrance.

The growth of the campus has created severe circulation and parking problems in city areas adjacent to the campus, and these may grow with expansion of the campus to the west (notably with the establishment of the Center for Health Sciences) and dispersion of the suburban development of the city's outskirts.

Residential zoning in the city is predominantly single-family with permitted densities of under ten dwelling units/net acre. The areas just north and east of the academic core are zoned mostly for multiple residential uses (up to 54 dwelling units/net acre permitted). There are two commercial zones just north of the campus on Russell Boulevard. Four commercial zones permit a full range of activities within the central business district. There is no industrial or manufacturing zone near the campus.

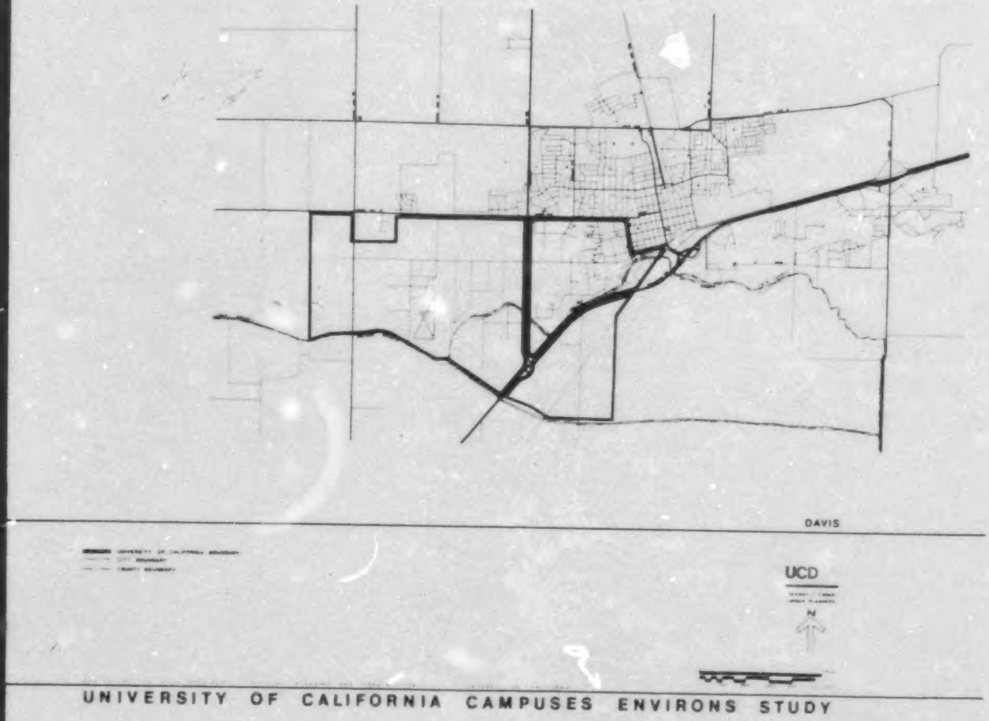
PHOTOGRAPH 2

DAVIS CAMPUS, AERIAL VIEW, 1972

View looking east. Photograph by United Aerial Survey.

MAP 7

DAVIS CAMPUS ENVIRONS


DAVIS
UNIVERSITY OF CALIFORNIA BOUNDARY
CITY BOUNDARY
COUNTY BOUNDARY
UCD
N
UNIVERSITY OF CALIFORNIA CAMPUSES ENVIRONS STUDY

C. TRANSPORTATION ORIENTATION

In the typology developed for this study, Davis has been identified as a bicycle-oriented campus because more than one-half of its students bicycled to campus in 1971-72. The dominance of the bicycle has been consistent and growing despite considerable enrollment increases. In 1965-66, enrollment was 7,727; by 1971-72, it had grown to 13,718. In 1965-66, 4,172 (54%) students bicycled to campus; in 1971-72, 8,746 (64%) did so. Bicycling is a convenient transportation mode for nearly all students, as well as for many faculty and staff.

One report, in observing that Davis campus is known for its bicycles, states:

> "Probably no other college or university campus comparable in student body size has as many bicycles as the Davis campus of the University of California...not only students but faculty and staff bicycle to work on the campus...."[1]

The bicycling orientation at Davis has been directly fostered by a number of campus and community characteristics. Of most importance in fostering bicycle use has been the substantial amount of housing available for students near the campus. Although with a population of 25,000, the City of Davis is not extremely large, the environs land uses and housing markets are campus related; as a result of the considerable student housing supply, 87% of Davis' students live within two miles of campus.

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[1] University of California, Davis, "Commentary on Bicycles," January 1972, p. 1.

A second feature of the Davis campus which makes it hospitable to bicycling is the moderate density of the campus and the moderately urbanized campus environs which allows bicycle riding to be relatively safe from the hazards of other vehicle (car) congestion. Also, as shown in Map 8, the academic facilities are not all clustered around a single campus center; this dispersion motivates students to use their bicycles as transport from class to class. For students living both on-campus and in the community, all facilities for eating, recreation and shopping are within a short bicycle ride from their residence, yet not close enough to make walking more convenient than bicycling.

Third, and of great importance, is that the flat topography of the campus environs makes the campus easily accessible and considerably attractive to less energetic (non-recreation-oriented) bicyclists.

Finally, the most important factor in encouraging bicycle use at Davis have been the recognition by city and campus planners that the campus is an attractive place for bicycling, and the efforts by campus administrators to make bicycling a paramount feature of the campus community transportation system. Campus planners at Davis recognize that:

> "The natural topography of expanding the physical plant and extending facilities further from the center of the campus has been conducive to bicycle use. These two things coupled with a lack of other modes of transportation...make bicycling almost a necessity for the average student."[2]

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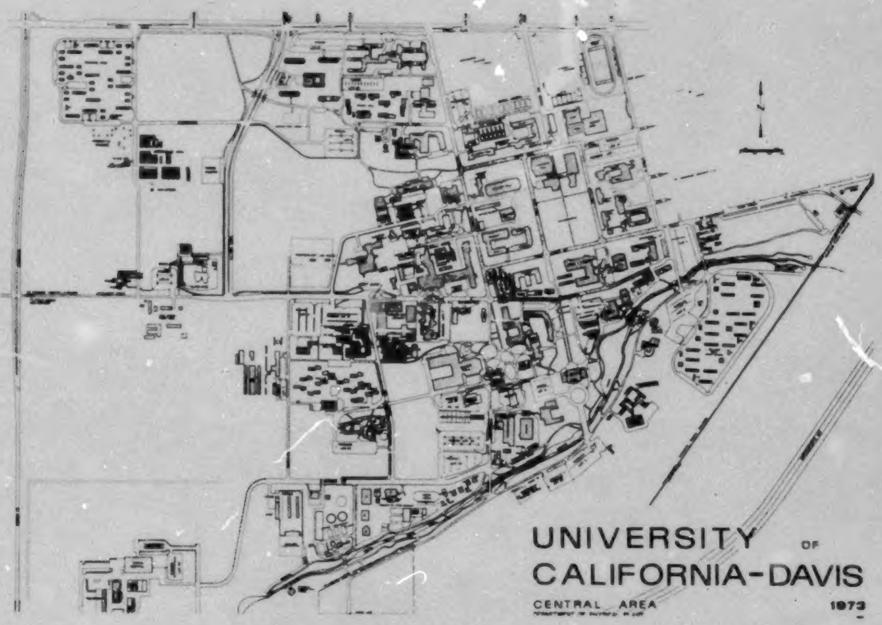
[2] *Ibid.*, p. 2.

MAP 8

DAVIS CAMPUS


UNIVERSITY OF
CALIFORNIA-DAVIS
CENTRAL AREA
1973

To take advantage of the flat topography and the extensive but not intensive campus development, both the Davis campus and the City of Davis have initiated programs to encourage bicyclists. Altogether, six separate factors can be identified which facilitate bicycling to campus.

First, on the campus an expanding network of bicycle paths has been developed to handle the flow of traffic. Major paths from living areas and from campus entrance points funnel traffic into the heart of the campus. For example, the City of Davis was the first city in the State of California to include bicycle paths as part of the transportation element of the city's general plan. Despite this, a major problem in handling traffic in the City of Davis is still one of separating bicycles from cars:

> "To minimize intermixing of bicycles and auto on heavily traveled streets off-campus, the City of Davis has instituted a system of bicycle paths on existing streets. Designated as 'bike-ways,' these are former traffic lanes of major arteries which have been closed to vehicular traffic."[3]

Because the development of these campus and community bikeways has the desirable consequences of reducing car/bicycle problems, the campus encourages the use of bicycles by the campus population as an alternative means of transportation to the automobile.

Second, the campus advocates bicycle use by providing bicycle parking adjacent to campus classrooms. A campus report notes:

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[3] *Ibid.*, p. 2.

PHOTOGRAPH 3

DAVIS CAMPUS, BICYCLE PARKING

Bike parking in front of the Chemistry Auditorium (not visible), the largest lecture hall on the campus. Note traffic sign with arrow, designed to control hundreds of bicycles in this area at class change time. Photograph by Doug Smith.

> "Many lots exclusively for bicycle use have been and are currently being developed with new building projects. Existing walks and pathways as well as street area once used as automobile parking are also utilized."[4]

Third, to provide an even more hospitable environment for bicycles, the central portion of the Davis campus has been closed to automobile traffic and student car parking lots have been located at the periphery of the campus rather than adjacent to academic buildings. This also serves to discourage students from driving to campus because it is actually a shorter walk to class from bicycle parking areas than from peripheral car parking lots.

Fourth, to deal with day-to-day problems created by bicyclists, a separate student bicycle patrol has been developed to aid the Davis Police Force. The patrol's activities and the consistent enforcement of bicycle regulations, aid traffic circulation and also help to recover stolen bicycles. By providing a safer environment for bicyclists, the increased use of bicycles is fostered.

A fifth factor is that a public bus system has been developed for the Davis campus area. By providing an alternative means of transportation to the car and to the bicycle, students during inclement weather can rely on the bus to bring them to campus. It is possible to speculate that if the bus did not operate, students might bring cars to campus on rainy days, and during fair weather continue to use them instead of bicycles.

Finally, the sixth factor which encourages students to ride bicycles rather than take their bicycles to campus is simply the cost difference between driving a car and riding a bicycle. Besides cost

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[4] *Ibid.*, p. 2.

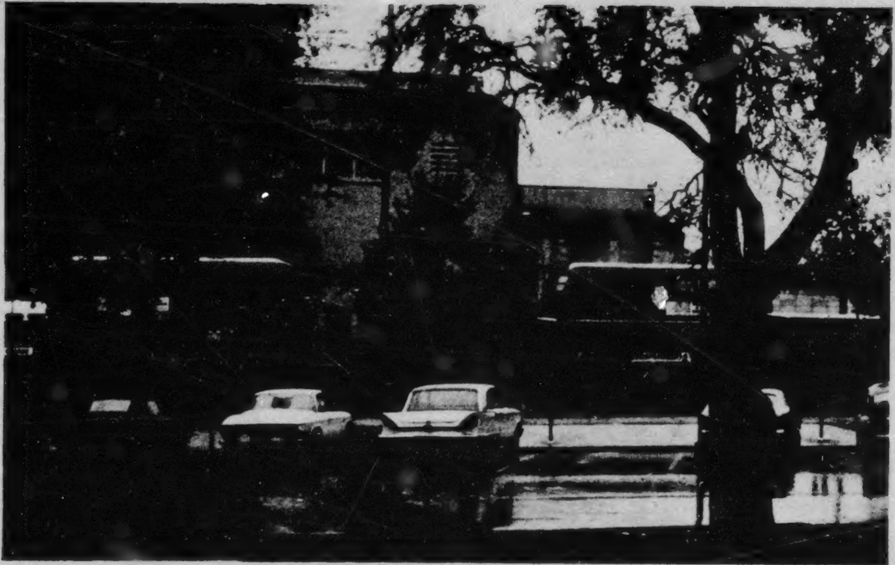
PHOTOGRAPH 4

DAVIS CAMPUS, LONDON BUS

London Bus (UNITRANS, a ASUCD operation) unloading at terminal on the campus.

PHOTOGRAPH 5

DAVIS CAMPUS, LONDON BUSES



London Busses parked at terminal on west side of Hickey Gymnasium on the campus.

differences between car ownership and bicycle ownership, which are obviously considerable, it costs more to bring a car to campus than a bicycle. Car parking permits at Davis costs from $25 to $40 per year; bicycle registration costs only $3 for two years. There is no charge for bicycle parking on-campus.

In summary, by providing bikeways on and off campus and areas for bicycle storage, closing the central portion of the campus to cars, supervising traffic circulation and car parking, making public transit available for bicyclists during bad weather and charging less for bicycle registration than car registration and parking, the Davis campus has actively encouraged students to bicycle to campus.

D. THE "BICYCLE POOL" EXPERIMENT

An interesting attempt at the Davis campus to discourage bicycle theft and to encourage bicycle use on campus was the creation of a bicycle pool by the Associated Students of the University of California, Davis. In 1970, the ASUCD purchased older and inexpensive bicycles, painted them blue and gold, and left them on campus for students to use on their way from class to class. Besides wanting to make bicycles conveniently available, one purpose of providing this bicycle pool was to deter bicycle theft by students who "borrowed" other students' bicycles to get to class. Unfortunately, in a matter of weeks all the bicycles in the "bicycle pool" had disappeared, fallen into disrepair, or had parts missing from them so they were no longer usable. Within one month, the ASUCD declared the experiment a failure.

Not discouraged by the ASUCD experience, the City of Davis decided the experiment had not been successful because there was no one authorized to keep the bicycles in good running condition. It was hypothesized by the City that the bicycle vandalism had occurred because the bicycles had fallen apart. The City decided to try the "bicycle pool" idea with an authorized maintenance system. Within two weeks the same misfortunes that had befallen the ASUCD's bicycle program also beset the City's program. As a result of this experience, the ambitious "bicycle pool" program was abandoned both on the campus and in the City of Davis.

E. TRANSPORTATION MODES

1. The mean (average) distance of all student residences from campus was 2.22 miles, while the modal distance was 1-2 miles.

As shown in Tables 25 and 26, in 1971-72, 7,133 students (52% of the enrollment of 13,718) lived on campus or within one mile of campus; 4,801 (35%) lived within 1 to 2 miles of campus; 685 (5%) lived within 3 to 5 miles; and 1,098 (8%) lived six or more miles from campus.

2. Bicycling is by far the most popular mode of transportation to the Davis campus.

In 1971-72, more than six out of ten of Davis' 13,400 students used bicycles to get to campus, two out of ten used automobiles (were car drivers, car passengers, or came in car pools), one out of ten walked, and the remainder came by public transportation or motorcycle.

3. Bicycle use was very high among students living within two miles of campus.

As indicated in Table 26, approximately 71% rode bicycles to campus. Among students living within three to five miles of campus,

TABLE 25

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Davis Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	3,841	3,292	4,801	686	137	549	412	13,718	2.22
Car Driver	269	165	720	268	106	423	317	2,268	7.39
Car Passenger	231	33	96	27	12	44	21	464	3.12
Car Pool	38	33	96	34	8	55	58	322	7.21
Motor Scooter or Cycle	38	33	144	34	7	11	4	271	2.53
Bicycle	2,804	2,436	3,217	275	3	11	0	8,746	.86
Public Transportation	38	66	384	34	1	5	12	540	1.89
Walk	423	526	144	14	0	0	0	1,107	.72
Hitchhike	-	-	-	-	-	-	-	-	
TOTAL	3,841	3,292	4,801	686	137	549	412	13,718	2.22

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 26

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Davis Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	3,841	3,292	4,801	686	137	549	412	13,718	2.22
Car Driver	7%	5%	15%	39%	77%	77%	77%	17%	7.39
Car Passenger	6	1	2	4	9	8	5	3	3.12
Car Pool	1	1	2	5	6	10	14	2	7.21
Motor Scooter or Cycle	1	1	3	5	5	2	1	2	2.53
Bicycle	73	74	67	40	2	2	0	64	0.86
Public Transportation	1	2	8	5	1	1	3	4	1.89
Walk	11	16	3	2	0	0	0	8	0.72
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	2.22 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

bicycles were still the most popular form of transportation--40% of these students bicycled to campus.

4. The percentage of students bicycling to campus increased moderately between 1965-66 and 1971-72.

Table 27 shows that bicycle use increased from 54% to 64%. But, due to increased enrollments, the number of students riding bicycles to the Davis campus more than doubled between 1965-66 and 1971-72, from 4,172 to 8,746.

5. In the six years from 1965-66 to 1971-72, the increased use of public transportation reduced the percentage of students driving to campus.

As shown in Table 27, the percentage of car drivers decreased by one-fourth and the percentage of walkers to one-half. In 1965-66, 29% of students (2,241) used automobiles as transportation to campus, 15% (1,159) walked, 54% (4,172) bicycled, and 2% (155) used motorcycles. By comparison, in 1971-72, 22% of students (3,054) used automobiles to get to campus, 8% (1,107) walked, 64% (8,746) bicycled, and 6% (711) used other modes of transportation.

6. Despite the prominence of the bike at Davis, it is used primarily by students living within five miles of campus.

Beyond five miles, the car dominates as the most used mode of transportation. For example, although in 1971-72, less than 8% of Davis students lived six or more miles from campus, 95% of them came to campus in cars. They generated one-third of the student automobile traffic.

TABLE 27

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS

Davis Campus

1965-66, 1967-68, 1969-70, and 1971-72

TRANSPORTATION MODE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students	7,727	100%	9,918	100%	12,320	100%	13,718	100%
Car Driver	1,700	22%	1,885	19%	2,341	19%	2,268	17%
Car Passenger	309	4	496	5	493	4	464	3
Car Pool	232	3	198	2	246	2	322	2
Motor Scooter or Cycle	155	2	198	2	246	2	271	2
Bicycle	4,172	54	5,753	58	7,269	59	8,746	64
Public Transportation	0	0	99	1	493	4	540	4
Walk	1,159	15	1,289	13	1,232	10	1,107	8
TOTAL	7,727	100%	9,918	100%	12,320	100%	13,718	100%

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

TABLE 28

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Davis Campus

1971-72

	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								
VEHICLE	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	3,841	3,292	4,801	686	137	549	412	13,718	2.22
Car	1,383	1,810	3,025	542	119	450	317	7,646	3.01
Motor Scooter or Cycle	38	99	192	48	11	33	12	433	3.26
Bicycle	3,495	2,798	4,033	480	58	192	124	11,180	1.40
None	192	132	192	34	11	88	91	740	5.46
TOTAL	5,108	4,839	7,442	1,104	199	763	544	19,999	
(Keep Both Car and Bicycle)	1,267	1,547	2,641	418	62	214	132	6,281	2.15

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 29

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Davis Campus

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	3,841	3,292	4,801	636	137	549	412	13,718	2.22
Car	36%	55%	63%	79%	87%	82%	77%	56%	3.01
Motor Scooter or Cycle	1	3	4	7	8	6	3	3	3.26
Bicycle	91	85	89	70	42	35	30	82	1.40
None	5	4	4	5	8	16	22	5	5.46
TOTAL	133%	147%	155%	161%	145%	139%	132%	146%	
(Keep Both Car and Bicycle)	(33%)	(47%)	(55%)	(61%)	(45%)	(39%)	(32%)	(46%)	2.15 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

F. VEHICLE OWNERSHIP

1. At Davis, bicycle ownership is more popular than car ownership.

As shown in Tables 28 and 29, approximately eight out of ten students at Davis own bicycles, but only six out of ten students own cars.

2. Among students living within five miles of campus, bicycle ownership is substantial.

As illustrated in Table 29, 70% of students living three to five miles of campus own bicycles as do 89% of students living one to two miles from campus, 85% of students within one mile, and 91% of students living on campus.

3. At Davis, bicycle ownership is consistently great among all sub-classifications of student population, with only slight variation.

For example, the percentage of students owning bicycles is greater among lower-division than upper-division students and greater among upper-division than graduate-students--90% of lower-division, 81% of upper-division, and 71% of graduate students own bicycles. Moreover, single and women students are more likely to own bicycles than married or men students--84% of single students and 70% of married students own bicycles; 90% of women and 75% of men own bicycles.

4. Car ownership rates are more highly differentiated among the various student populations.

While 31% of lower-division students own cars, 59% of upper-division and 82% of graduate students do; likewise, 40% of single students own cars compared to 88% of married students; finally, 68% of men and 39% of women own cars. For further description, see Table 31.

TABLE 30

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE

Davis Campus

1965-66, 1967-68, 1969-70, and 1971-72

VEHICLE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students			9,918	100%	12,320	100%	13,718	100%
Car	Not Available		5,157	52%	6,653	54%	7,646	56%
Motor Scooter or Cycle			298	3	370	3	433	3
Bicycle			7,736	78	9,486	77	11,180	82
None			595	6	616	5	740	5
TOTAL			13,786	139%	17,125	139%	19,999	146%
(Keep Both Car and Bicycle)			(3,868)	(39%)	(4,805)	(39%)	(6,281)	(46%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

TABLE 31

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY CLASS STANDING, BY MARITAL STATUS AND BY SEX

Davis Campus

1971-72

VEHICLE	CLASS STANDING			MARITAL STATUS		SEX		ALL STUDENTS
	L. D.	U. D.	Grad.	Single	Married	Male	Female	
Number of Students	3,978	6,173	3,567	10,974	2,744	8,094	5,624	13,718
Car	31%	59%	82%	49%	88%	68%	39%	56%
Motor Scooter or Cycle	1	4	5	3	7	5	1	3
Bicycle	90	81	71	84	70	75	90	82
None	6	5	6	4	6	7	4	5
TOTAL	128%	149%	164%	140%	171%	155%	134%	146%
(Keep Both Car and Bicycle)	(28%)	(49%)	(64%)	(40%)	(71%)	(55%)	(34%)	(46%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

TABLE 32

PROBABILITY OF VEHICLE OWNERS USING THEIR VEHICLES FOR TRANSPORTATION TO CAMPUS

Davis Campus

1971-72

	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	Total/Average
Number of Students	3,841	3,292	4,801	686	137	549	412	13,718
Percent who own cars	36%	55%	63%	79%	87%	82%	77%	56%
Percent who drive cars	7%	5%	15%	39%	77%	77%	77%	17%
Probability of car owners driving to campus	0.19	0.09	0.24	0.49	0.89	0.94	1.00	0.30
Percent who own bicycles	91%	85%	89%	70%	42%	35%	30%	82%
Percent who ride bicycles	73%	74%	67%	40%	2%	2%	0%	64%
Probability of bicycle owners riding to campus	0.80	0.87	0.75	0.57	0.05	0.06	0.00	0.78

[a] Estimated based on other campuses. Includes some students who drive cars owned by their families.

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

5. Of all the University campuses, Davis has by far the highest percentage of students owning both cars and bicycles.

Almost half (46%) of the students own both a car and bicycle.

5. Davis also has the highest percentage of any of the University campuses of students with vehicles.

As shown in Table 31, 95% of Davis students have at least a car, or a bicycle, or a motorscooter or cycle. Only Santa Barbara campus, where 89% of students have vehicles, approaches this high ownership rate; by contrast, 55% of Santa Cruz students own vehicles--the lowest ownership rate among the campuses.

G. VEHICLE USE

1. Reflecting the fact that Davis is a bicycle-oriented campus, a high proportion of Davis students use the bicycles they own for transportation to campus and a low proportion of students use the cars they own for transportation to campus.

As shown in Table 32, out of every ten students, eight own bicycles and six use their bicycles to get to campus, while again, for every ten students, six own cars and two use their cars to get to campus.

This suggests that the number of people who use their vehicles for transportation to campus is a more reliable indicator of the actual amount traffic generated by students traveling to campus than vehicle ownership is. Although six out of ten Davis students own cars, which is the same as the average for all the University campuses, only a limited amount of car traffic is generated. Because Davis is a bicycle-oriented campus, the car owners leave their cars at their residences.

IX. IRVINE

A. SUMMARY

Irvine has been classified as a heavily automobile-oriented campus beacuse over three-quarters of the students enrolled in 1971-72 used cars for transportation to campus, the highest proportion of cars at any of the University of California campuses.

Contributing to this need for auto use was the severe shortage of close-by student housing--only one-third of the students at Irvine lived within two miles of the campus. While this could be considered biking distance at the bicycle- or pedestrian-oriented campuses, access to the Irvine campus is along heavily traveled, high-speed primary roads which are dangerous for bicyclists. Thus, students living within two miles of Irvine overwhelmingly prefer cars. Of those living farther than three miles, more than nine out of ten drove cars to campus.

Prior to 1971, there was only limited effort toward establishing bikeways, and the effort to encourage public transportation to the campus has been quite recent, although the substantial number of students who arrive as car passengers continue to be a potential reservoir to be tapped by public transit. The trend, through 1971-72, however, was toward cars. Walking steadily decreased in popularity through 1971-72, and while bicycle use slowly increased, it was still almost negligible. The percentage of car usage has been increasing very slowly, but because housing near the campus failed to keep up with the demand, students lived farther away from campus. Therefore, to prevent present patterns from continuing, which would lead to even greater numbers of cars converging on the Irvine campus, efforts are being directed toward encouraging a regional public transit serving the campus and toward the provision of bikeways.

Irvine also had the highest rate of car ownership of the nine campuses, with almost three quarters of the students keeping cars at their residences. In contrast with car ownership, which had been increasing slowly, bicycle ownership doubled in four years, to the point where one-third of the students kept bicycles in 1971-72, presumably for recreation since so few rode to campus.

Unlike the bicycle-oriented campuses (Davis and Santa Barbara), bike ownership at Irvine was consistent regardless of distance from campus, class level, marital status and sex, similar to San Francisco and Berkeley, where bicycles were also more likely to be used for recreation than for transportation. Recreational bicycling seems to attract all students equally at any given campus, although at different campuses bicycling has varying levels of popularity: at San Francisco it was half as popular as at Berkeley or Irvine, which were in turn quite low in comparison to the bicycle-oriented campuses.

As with the other campuses, what made Irvine so completely car-oriented was not the ownership rates themselves, but the probability that students would travel to campus in the cars they kept at their residences. The overall probability (1971-72) that they would do this was 89%, and for those students living three or more miles from campus, the probability was virtually 100%. In contrast, of the one in three students who did own bikes, only one in five was likely to bring his or her bike to campus because of the car-bike hazards present in the Irvine environs.

B. BACKGROUND

The Irvine campus, along with San Diego and Santa Cruz, is one of the three new campuses of the University of California, having opened in fall 1965 with 1,528 students. By 1971-72, the enrollment was 6,519 students.

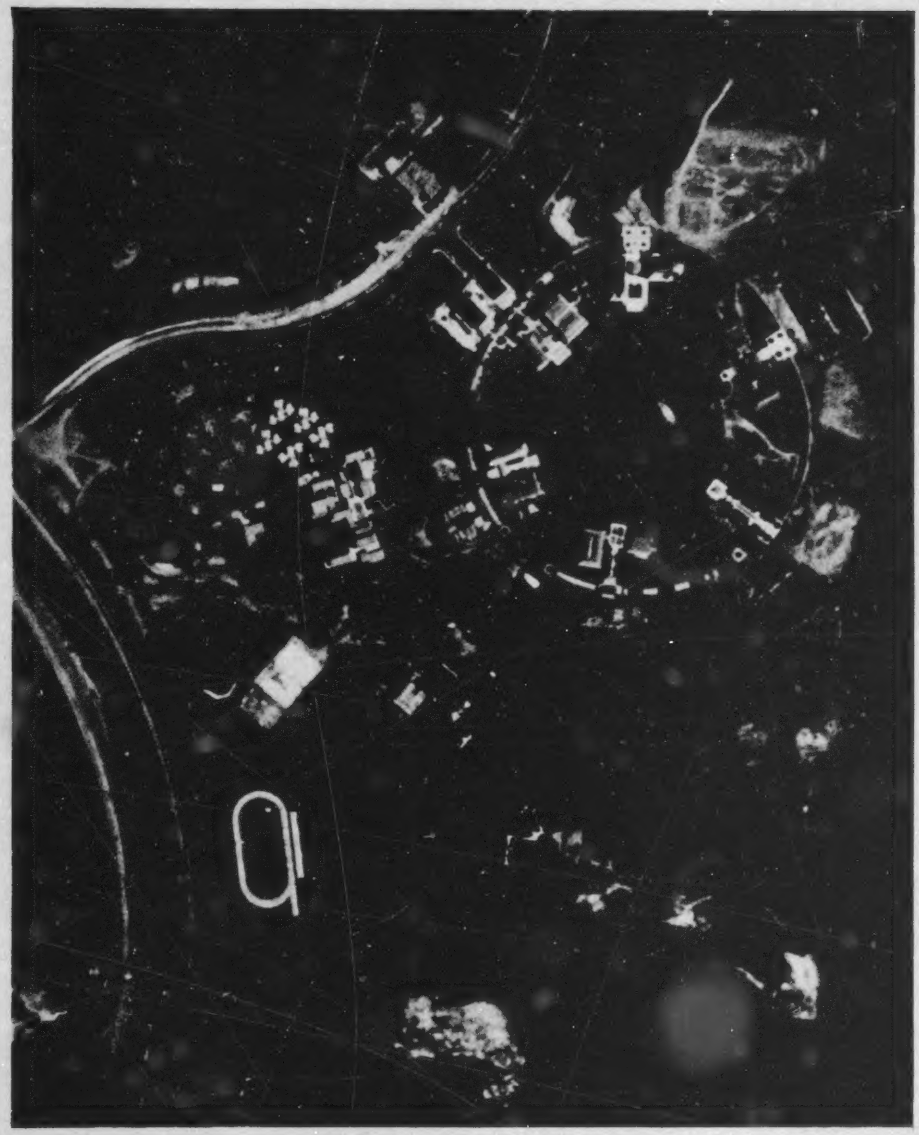
The 1,510-acre campus and its environs are in south Orange County in the newly incorporated City of Irvine (1971). The environs include part of the Irvine Industrial Complex, a fast growing industrial-research center drawing commuters from all of Orange County and from Los Angeles County as well. The Irvine Company, whose landholdings surround the campus, is the only significant private owner in the environs.

At present, and as shown in Map 9, the use of land close to campus for low-density, high-income development means housing choices among low- and moderate-income employees as well as students must be in areas beyond the campus environs. Through time, this may also mean dispersal of University employees and students over a wide geographic area. In addition to housing demand created by the campus, the population and service-industry boom in this area of Orange County during the 1960s created additional competition for housing. The lack of public transit connections between campus and other urban areas in the county, especially the attractive beach areas, is a continuing problem.

Previous Orange County zoning and present city zoning for the environs is agricultural but the area is being developed pursuant to "Planned Community" regulations governing the Irvine Ranch. These regulations allow primarily residential uses, with maximum densities ranging from five

PHOTOGRAPH 6

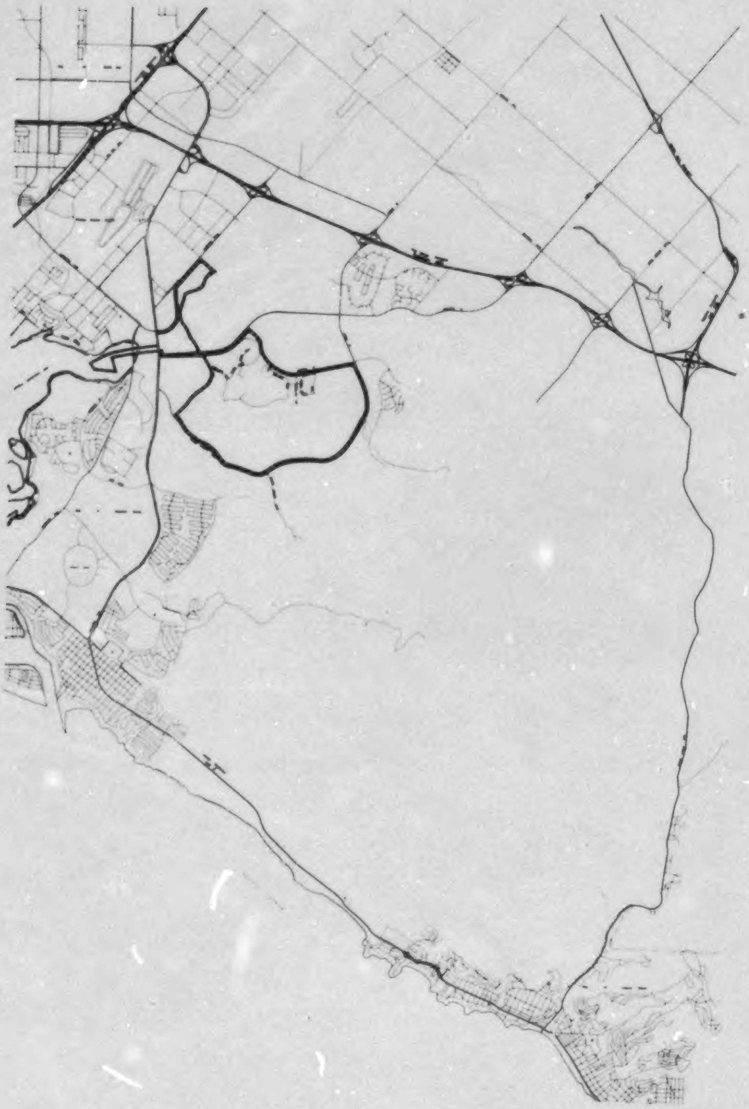
IRVINE CAMPUS, AERIAL VIEW, 1973



Overhead view, with northeast direction at top of page.

MAP 9

IRVINE CAMPUS ENVIRONS


IRVINE
UNIVERSITY OF CALIFORNIA BOUNDARY
CITY BOUNDARY
COUNTY BOUNDARY
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UNIVERSITY OF CALIFORNIA CAMPUSES ENVIRONS STUDY

dwelling units/net acre or less, to 25 dwelling units/net acre. The highest densities permitted are immediately north of the academic core, while the lowest are east of the campus. Single- and multi-family dwellings are permitted. The remaining residential zones are predominantly medium-density (up to 10 du/net acre).

The largest commercial zone adjoins the campus north of Campus Drive; other smaller commercial zones are scattered throughout the environs. Permitted uses, in all cases, range from retail to auto sales and services. Two large areas zoned for industrial research are located northwest of the campus, south of the San Diego Freeway and east of MacArthur Boulevard. There is also a large industrial zone northwest of the environs boundary.

C. TRANSPORTATION ORIENTATION

The Irvine campus is located three miles north of the Pacific Ocean and is a 40-minute drive from the Los Angeles area. As shown in Map 9, the campus is close to Santa Ana and Newport Beach. This location--in the path of, but still away from, major urban development--as well as other features of the campus have resulted in the automobile being the dominant mode of transportation to the campus. (This is in contrast to Davis and Santa Barbara where the non-urban environment contributes to a bicycle-orientation.)

First, the location of the campus has stimulated a car-orientation because there is little privately developed student housing available in the vicinity of the campus. This means that students must either live in the available University-owned housing on campus, beyond the campus environs, often with their parents or relatives, or in the beach communities where housing of moderate rental rates, except during summer periods, is readily available. In 1971-72, only 34% of Irvine students lived within two miles of the campus. Of these students living within two miles, 26% lived in on-campus housing, 47% lived in private housing in the campus environs and 26% lived with their parents or relatives.

Second, because the campus was located with the expectation that it would serve future urban development, there is, at present, a paucity of urban activities close to campus. This means students must travel relatively substantial distances from campus to reach work, recreation, shopping or entertainment.

Third, because the car seems to be the most practical form of transportation to campus thus far, campus policy through 1971-72 accommodated cars on campus rather than advocate other transportation systems. As shown in Map 10, and in the campus aerial photograph, parking lots are convenient to academic buildings and ample parking space has been provided. As of 1971-72, the campus had approximately 52 parking spaces per 100 full-time students, faculty and staff. This was the second highest ratio among University campuses; only Riverside was higher at 58 spaces per 100 students, faculty and staff.

Although it is not possible to say for certain whether the availability of parking has contributed to the high percentage of students driving to campus, it is clear that the availability of ample parking does little to discourage students from driving. Similarly, the fact that through 1971-72 parking was convenient and easily available stimulated only limited efforts by the campus community to seek or to advocate development of alternative transportation modes, such as public transit.[1]

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[1] Students in Irvine, in 1972-73, started assessing themselves $1.00 per quarter to help support the local public transit system.

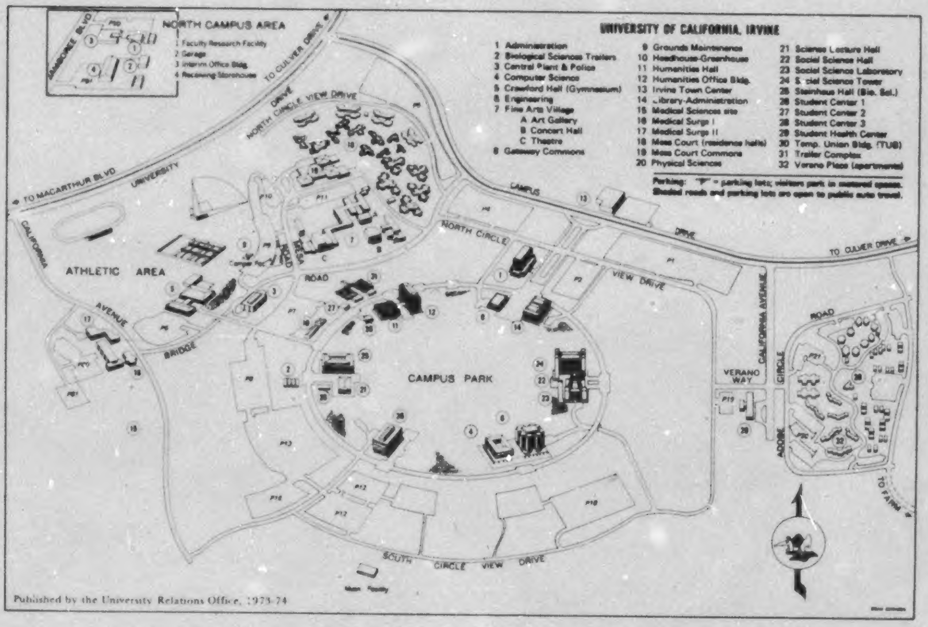
PHOTOGRAPH 7

IRVINE CAMPUS, MAIN CAMPUS AREA

Early view of campus looking north toward Fine Arts Complex, and Student Residence Halls.

MAP 10

IRVINE CAMPUS


UNIVERSITY OF CALIFORNIA, IRVINE
1 Administration
2 Biological Sciences Trailers
3 Central Plant & Police
4 Computer Science
5 Crawford Hall (Gymnasium)
6 Engineering
7 Fine Arts Village
A Art Gallery
B Concert Hall
C Theatre
8 Gateway Commons
9 Grounds Maintenance
10 Headhouse-Greenhouse
11 Humanities Hall
12 Humanities Office Bldg.
13 Irvine Town Center
14 Library-Administration
15 Medical Sciences site
16 Medical Surge I
17 Medical Surge II
18 Mesa Court (residence halls)
19 Mesa Court Commons
20 Physical Sciences
21 Science Lecture Hall
22 Social Science Hall
23 Social Science Laboratory
24 Social Science Tower
25 Steinhaus Hall (Bio. Sci.)
26 Student Center 1
27 Student Center 2
28 Student Center 3
29 Student Health Center
30 Temp. Union Bldg. (TUB)
31 Trailer Complex
32 Verano Place (apartments)
Parking: "P" = parking lots; visitors park in metered spaces.
Shaded roads and parking lots are open to public auto travel.
NORTH CAMPUS AREA
1 Faculty Research Facility
2 Garage
3 Interim Office Bldg.
4 Receiving Storehouse
JAMBOREE BLVD
TO CULVER DRIVE
NORTH CIRCLE VIEW DRIVE
TO MACARTHUR BLVD
UNIVERSITY
DRIVE
CALIFORNIA
AVENUE
ATHLETIC AREA
MESA
ROAD
BRIDGE
CAMPUS
DRIVE
NORTH CIRCLE
VIEW DRIVE
TO CULVER DRIVE
CAMPUS PARK
CALIFORNIA AVENUE
VERANO WAY
CIRCLE
ADOBE
ROAD
TO FARM
SOUTH CIRCLE VIEW DRIVE

Published by the University Relations Office, 1973-74

D. TRANSPORTATION MODES

1. The mean (average) distance of all student residences from campus was 7.71 miles, while the modal distance was 6 to 10 miles.

As shown in Table 34, in 1971-72, 1,955 students (30% of the enrollment of 6,519) lived on-campus or within one mile of campus; 261 (4%) lived within 1 to 2 miles of campus; 978 (15%) lived within 3 to 5 miles; and 3,325 (51%) lived six or more miles from campus.

2. Irvine has been classified in this report as a heavily automobile-oriented campus because more than three-fourths of its students depend upon cars for transportation.

As illustrated in Tables 33, 34, and 35, in 1971-72, as many as 81% of the students used automobiles (66% drove and 15% were car passengers or were in car pools) to travel to campus. This means that of the 1971-72 student population, over 4,302 students drove cars to campus and 978 were car passengers or in car pools. Of the remaining students who were not car-oriented, 9% walked, 6% bicycled, and 2% traveled by motorcycle to campus.[2]

3. Because of the lack of environs development, students live a considerable distance from the campus and commute.

Among students living 1 to 2 miles from campus, 75% came by auto; as the distance increased, so did the percent of automobile-oriented students. Among students at Irvine living 3 to 5 miles from campus, 92% came by car; at 6 to 10 miles, 95%; at 11 to 20 miles, 97%; and at more than 20 miles, 99% came by car.

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[2] Preliminary data from January 1974 shows that transportation patterns of Irvine students are changing. In 1974, only 74% of students used automobiles (62% drove and 12% were in car pools or were car passengers), 9% walked, 5% bicycled, 11% came by public transportation (this was the period of the gasoline shortage), and 1% came by motorcycle.

4. Collectively, and making allowances for car passengers and car pools, Irvine students in 1971-72 brought more than 4,700 cars to campus daily.

This number was exceeded only by Los Angeles (13,300) and slightly by Berkeley (5,700) although the Berkeley campus had more than four times the enrollment at Irvine.

5. The most significant change in the travel patterns of students at the Irvine campus during the four years, 1967-68 to 1971-72, was the increase in the percentage of both students who used cars and who used bicycles as transportation to campus and the decrease in the percentage of students walking to campus.

As illustrated in Table 35, the percentage of students at Irvine who used cars for transportation increased from 73% in 1967-68 to 81% in 1971-72; the percentage of students bicycling to campus increased from 3% to 6%. During the same time period, the percentage of students walking to campus decreased from 21% to 11% while, because of a 250% increase in enrollment, the actual number of students walking increased from 581 to 700.

6. Part of the shift from walking to driving and from walking to bicycling to the campus can be attributed to the increasing proportion of students living farther from campus.

Between 1967-68 and 1971-72, the percentage of students living within one mile of the Irvine campus decreased from 50% to 27%. This decrease in the percentage of students living close to campus was, first, because there has been little private construction of housing for students near the campus and, second, the construction of on-campus housing has not kept pace with enrollment growth.

TABLE 33

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Irvine Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	1,694	261	261	978	1,369	1,304	652	6,519	7.71
Car Driver	542	99	162	762	1,068	1,070	554	4,257	9.61
Car Passenger	288	10	24	98	151	78	26	675	5.03
Car Pool	34	13	10	39	82	117	65	360	11.56
Motor Scooter or Cycle	17	8	5	19	27	26	7	109	7.94
Bicycle	220	55	39	50	41	13	0	418	1.26
Public Transportation	0	0	0	0	0	0	0	0	0
Walk	593	76	21	10	0	0	0	700	.31
Hitchhike	-	-	-	-	-	-	-	-	
TOTAL	1 694	261	261	978	1,369	1,304	652	6,519	7.71

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 34

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Irvine Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	1,694	261	261	978	1,369	1,304	652	6,519	7.71
Car Driver	32%	38%	62%	78%	78%	82%	85%	66%	9.61
Car Passenger	17	4	9	10	11	6	4	10	5.03
Car Pool	2	5	4	4	6	9	10	5	11.56
Motor Scooter or Cycle	1	3	2	2	2	2	1	2	7.94
Bicycle	13	21	15	5	3	1	0	6	1.26
Public Transportation	0	0	0	0	0	0	0	0	0.00
Walk	35	29	8	1	0	0	0	11	0.31
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	7.71 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 35

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS

Irvine Campus

1965-66, 1967-68, 1969-70, and 1971-72

TRANSPORTATION MODE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students	1,528	100%	2,765	100%	4,986	100%	6,519	100%
Car Driver	1,161	76%	1,687	61%	3,241	65%	4,285	66%
Car Passenger	122	8	276	10	349	7	661	10
Car Pool	199	13	55	2	249	5	346	5
Motor Scooter or Cycle	31	2	55	2	50	1	109	2
Bicycle	15	1	83	3	249	5	418	6
Public Transportation	0	0	28	1	0	0	0	0
Walk	0	0	581	21	848	17	700	11
TOTAL	1,528	100%	2,765	100%	4,986	100%	6,519	100%

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

It is clear, however, that even if the percentage of students living close to campus did increase, there would still be a large number of cars driven to campus and stored there. This is because a high percentage of students living in University-owned housing are car owners.

Table 34 shows that of the students who live in on-campus housing within one-half to one mile of campus, 51% depend on cars for transportation to campus (32% of students drive to campus and 19% are car passengers ~~or~~ ride in car pools). Among students living within two miles of campus--bicycling distance--as many as three-fourths of students depend on cars for transportation to campus.

E. VEHICLE OWNERSHIP

1. The students at Irvine had the highest rate of car ownership of the nine campuses.

In 1971-72, more than seven out of ten Irvine students owned automobiles. As illustrated by Tables 36 and 37, approximately one out of three students owned bicycles, one out of five students did not own any vehicles, and one out of four owned both cars and bicycles. Although the percentage of students owning cars remained stable over the four years surveyed, bicycle ownership nearly doubled in the later two years. As shown in Table 38, in 1969-70, 17% of Irvine students owned bicycles; in 1971-72, 31% owned bicycles.

2. Car ownership among students increased during the period, 1967-68 to 1971-72.

As shown in Table 38, in 1967-68, 68% of all students owned cars; in 1971-72, 74% did so.

TABLE 36

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Irvine Campus

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	1,694	261	261	978	1,369	1,304	652	6,519	7.71
Car	949	188	209	773	1,082	1,082	554	4,837	8.01
Motor Scooter or Cycle	34	13	13	39	55	39	13	206	6.41
Bicycle	745	89	115	332	465	209	59	2,014	5.56
None	373	47	23	137	205	274	130	1,189	9.28
TOTAL	2,101	337	360	1,281	1,807	1,604	756	8,246	
(Keep Both Car and Bicycle)	407	76	99	303	438	300	104	1,727	6.95

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 37

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Irvine Campus

1971-72

	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								
VEHICLE	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	1,694	261	261	978	1,369	1,304	652	6,519	7.71
Car	56%	72%	80%	79%	79%	83%	85%	74%	8.01
Motor Scooter or Cycle	2	5	5	4	4	3	2	3	6.41
Bicycle	44	34	44	34	34	16	9	31	5.56
None	22	18	9	14	15	21	20	18	9.28
TOTAL	124%	129%	138%	131%	132%	123%	116%	126%	
(Keep Both Car and Bicycle)	(24%)	(29%)	(38%)	(31%)	(32%)	(23%)	(16%)	(26%)	6.95 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 38

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE

Irvine Campus

1965-66, 1967-68, 1969-70, and 1971-72

VEHICLE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students			2,765	100%	4,986	100%	6,519	100%
Car	Not Available		1,880	68%	3,540	71%	4,837	74%
Motor Scooter or Cycle			83	3	149	3	206	3
Bicycle			415	15	848	17	2,014	31
None			746	27	1,097	22	1,189	18
TOTAL			3,124	113%	5,634	113%	8,246	126%
(Keep Both Car and Bicycle)			(359)	(13%)	(648)	(13%)	(1,727)	(26%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

3. Dual vehicle ownership, i.e., both car and bicycle, also increased.

Dual ownership occurred among 13% of the students in 1969-70, increasing to 26% in 1971-72.

4. In contrast to the other campuses, where auto ownership increased the farther a student lived from campus, Irvine students had a high ownership rate regardless of distance.

Except for the 72% of students who lived within one mile and owned cars, about 80% of all other Irvine students, regardless of distance from campus, owned cars.

5. Bicycle ownership was relatively constant.

About 35% to 45% of students living at distances of less than ten miles from campus owned bicycles; ownership decreased sharply for students living beyond eleven miles from campus. Ownership rates by distance are further amplified in Tables 36 and 37.

6. The percentage of students owning cars increased with higher academic class standing, was higher among married students than single students and was higher among men than women.

As indicated in Table 39, 57% of lower-division, 77% of upper-division and 86% of graduate students owned cars; 68% of single and 83% of married students owned cars, and 73% of men and 65% of women owned cars.

7. In contrast to car ownership, bicycle ownership did not vary among students of different academic class standing, marital status or sex.

As shown in Table 39, 35% of lower division, 31% of upper division, and 30% of graduate students owned bicycles; 32% of single and 31% of married students own bicycles; and 30% of men and 35% of women owned bicycles. This relatively consistent pattern of bicycle ownership

TABLE 39

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY CLASS STANDING, BY MARITAL STATUS AND BY SEX

Irvine Campus

1971-72

VEHICLE	CLASS STANDING			MARITAL STATUS		SEX		ALL STUDENTS
	L. D.	U. D.	Grad.	Single	Married	Male	Female	
Number of Students	2,738	2,608	1,173	5,283	1,236	3,911	2,608	6,519
Car	57%	77%	86%	68%	83%	73%	65%	74%
Motor Scooter or Cycle	2	4	4	3	6	5	1	3
Bicycle	34	31	30	32	31	30	35	31
None	28	17	11	22	15	19	23	18
TOTAL	121%	129%	131%	125%	135%	127%	124%	126%
(Keep Both Car and Bicycle)	(21%)	(29%)	(31%)	(25%)	(35%)	(27%)	(24%)	(26%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

TABLE 40

PROBABILITY OF VEHICLE OWNERS USING THEIR VEHICLES FOR TRANSPORTATION TO CAMPUS

Irvine Campus

1971-72

	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	Total/ Average
Number of Students	1,694	261	261	978	1,369	1,304	652	6,519
Percent who own cars	56%	72%	80%	79%	79%	83%	85%	74%
Percent who drive cars	32%	38%	62%	78%	78%	82%	85%	66%
Probability of car owners driving to campus	0.57	0.53	0.78	0.99	0.99	0.99	1.00	0.89
Percent who own bicycles	44%	34%	44%	34%	34%	16%	9%	31%
Percent who ride bicycles	13%	21%	15%	5%	3%	1%	0%	6%
Probability of bicycle owners riding to campus	0.30	0.62	0.34	0.15	0.09	0.06	0.00	0.19

[a] Estimated based on other campuses. Includes some students who drive cars owned by their families.

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

(although at a lower level) also occurred at Los Angeles. One explanation is that the Irvine bicycle owners use the bicycles more for recreation than for transportation, with their bicycle ownership rates reflecting the norm for their student status and campus residence location.

F. VEHICLE USE

It has been previously illustrated that students at different campuses have different probabilities of using the vehicles they own.

1. At Irvine, vehicle use as a percentage of ownership is substantial for car owners and low for bicycle owners.

The probability in 1971-72 that a student would use the car he owned for transportation to campus was 89%; however, the probability that the student would use the bicycle he owned was only 19%. As shown in Table 40, among all students living three or more miles from the Irvine campus, there was a 99% probability that if the student owned a car, he or she would drive to campus.

This propensity for Irvine students to use their cars for travel to campus, but not use their bicycles, reflects the danger in bicycling along the heavily traveled primary roads near the campus, and suggests that the travel orientation of the campus affects how much traffic will be generated by students to a greater extent than does vehicle ownership.

Because of the many related factors of topography, hazards and environs development, the travel style of the campus may encourage students to leave their bicycles and cars at home--as the pedestrian-oriented campus illustrates; or, to bring their bicycles to campus and leave their cars at home--as at the bicycle-oriented campus; or, to bring their cars to campus and leave their bicycles at home--as at the car-oriented campus, which Irvine illustrates.

X. LOS ANGELES

A. SUMMARY

Los Angeles has been classified as moderately-automobile-oriented because in 1971-72 over half of the students drove to campus. Another one-quarter of the students walked to campus, with only one in twenty coming by bicycle. Public transit was used by almost 10% of the students, which was comparable to Berkeley and San Francisco--the other two urban campuses; while this was not an overwhelming figure, it was still greater than any other non-urban campus except Santa Cruz.

The emphasis on cars at Los Angeles has been fostered by the large numbers of students living substantial distances from the campus--well over half of the students live beyond three miles. Because the campus provides a relatively large amount of parking, there is little deterrent to driving. Although walking dominated the most popular mode of transportation for students living on-campus or within one mile, use of cars is the primary transportation mode beyond one mile.

During the six years surveyed (1965-66 to 1971-72), two changes occurred which provided a further clue to the variables which affect Los Angeles' transportation patterns. Between 1965-66 and 1967-68, both walking and driving rose considerably, at the expense of car pools and public transportation. The increase in numbers of pedestrians reflected an increase in the number of students living within one mile of campus following the construction of new private housing in the immediate campus environs during that year. However, while this increase in walking might be expected to affect the number of drivers, the opening of two large parking structures on the campus apparently stimulated an increase in students driving themselves to campus rather than car pooling or moving closer to campus. The result was an increase in the number and percent of students driving, and a substantial decrease in the number and percent of students [illegible] car pools.

In 1971-72, almost two-thirds of the students owned cars, with those living at greater distances from campus more likely to own them than those living closer. The probability that a student who owned a car would use it for transportation to campus was 70%--the same as Riverside--the most moderately-automobile-oriented campus. This use rate can be compared with the heavily automobile-oriented campuses (Irvine and San Diego), where the probability was 90% that a student who owned a car would use it to get to campus.

While bicycles were still not a very popular form of transportation to campus in 1971-72, they had started to gain in popularity during the last two years of the survey, seemingly at the expense of pedestrians rather than drivers.

Ownership of bicycles also more than doubled in the two-year period, 1969-70 to 1971-72. Because bicycle ownership followed the pattern of students with a recreation orientation, there was no significant variation in bicycle ownership according to distance from campus, class standing, marital status or sex. Moreover, Los Angeles does not seem to inspire as much recreational bicycling as the other auto campuses; with less than one in five students owning a bicycle, bicycle ownership was similar to the San Francisco campus.

B. BACKGROUND

The 411-acre Los Angeles campus is surrounded by development on three sides. With a few important exceptions shown in the aerial photographs and in Map 11 (e.g., the 620-acre Veterans Administration property), the Los Angeles campus environs area corresponds to the Westwood Community within the City of Los Angeles. Westwood Village is the original campus site and it is there that the campus has its primary impact. However, Westwood is long past its "village" days. It is now a high density urban center with prestige office buildings and larger facilities such as the Veterans Administration (VA) Hospital.

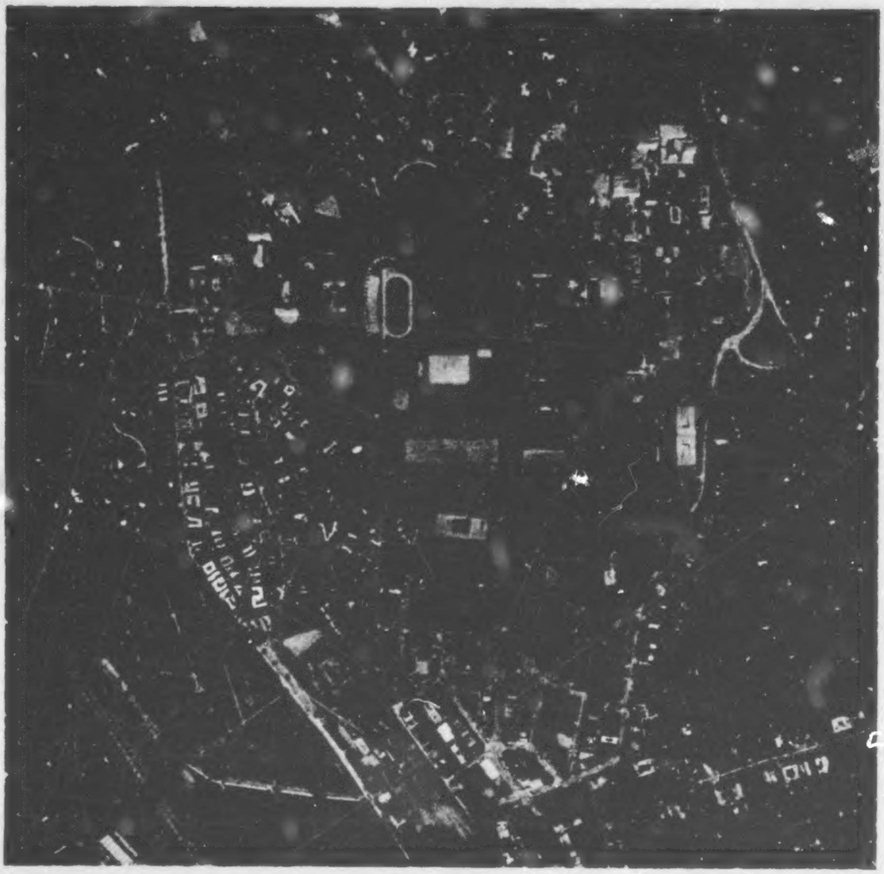
Westwood is heavily congested because of the area's inadequate street pattern and because of the high volume of University-destined commuters who travel through Westwood. Public transportation is also a problem that may some day be eased by a revised proposal for mass transit in Los Angeles.

The campus environs are zoned principally for residential purposes but there are also large commercial zones along major thoroughfares. Student residential uses in the environs have been preempted in the north and east by low-density, high-income development of the surrounding area.

The highest residential densities permitted are found to the south and southwest of the campus, with dwelling types ranging from single-family to multi-story apartments (including group dwellings). To the north and east, the predominant-type permitted is single-family dwellings, with maximum densities of eight dwelling units/net acre, while to the south and west, especially along Santa Monica Boulevard, multi-family units of up to 50 du/net acre are permitted. All the commercial zones are south of the campus and extend from Westwood to Century City. The only industrial zone is a small, light-industrial area south of the VA property.

PHOTOGRAPH 8

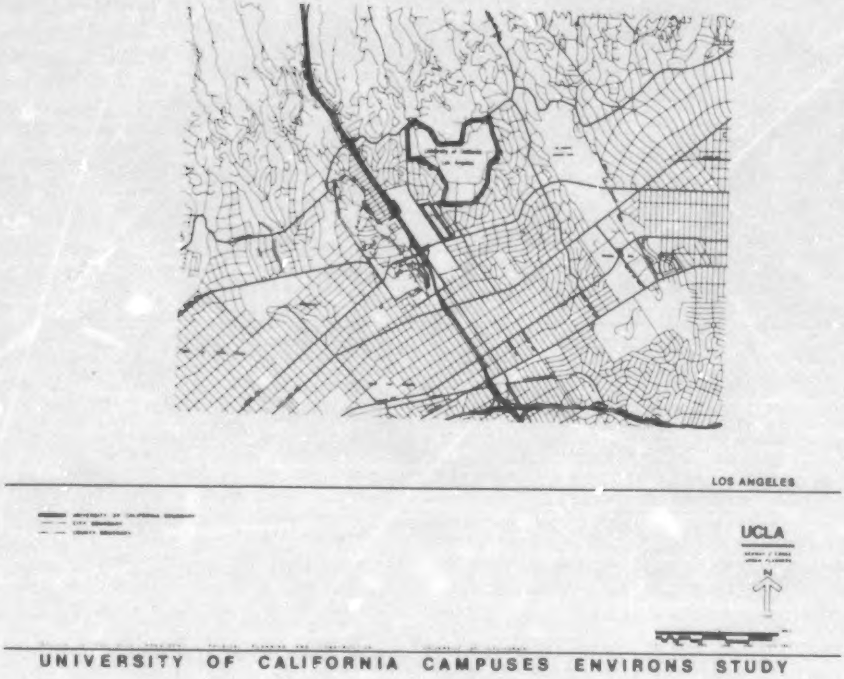
LOS ANGELES CAMPUS, AERIAL VIEW, 1971



Overhead view; north at top of page. Photograph by Pafford and Associates.

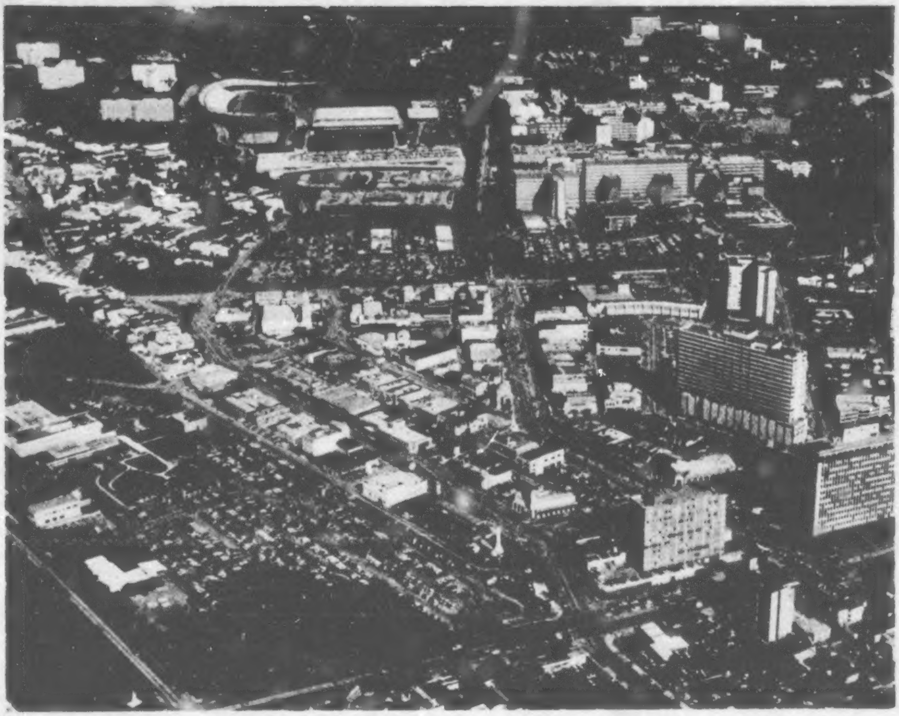
MAP 11

LOS ANGELES CAMPUS ENVIRONS


LOS ANGELES
UCLA
N
UNIVERSITY OF CALIFORNIA CAMPUSES ENVIRONS STUDY

PHOTOGRAPH 9

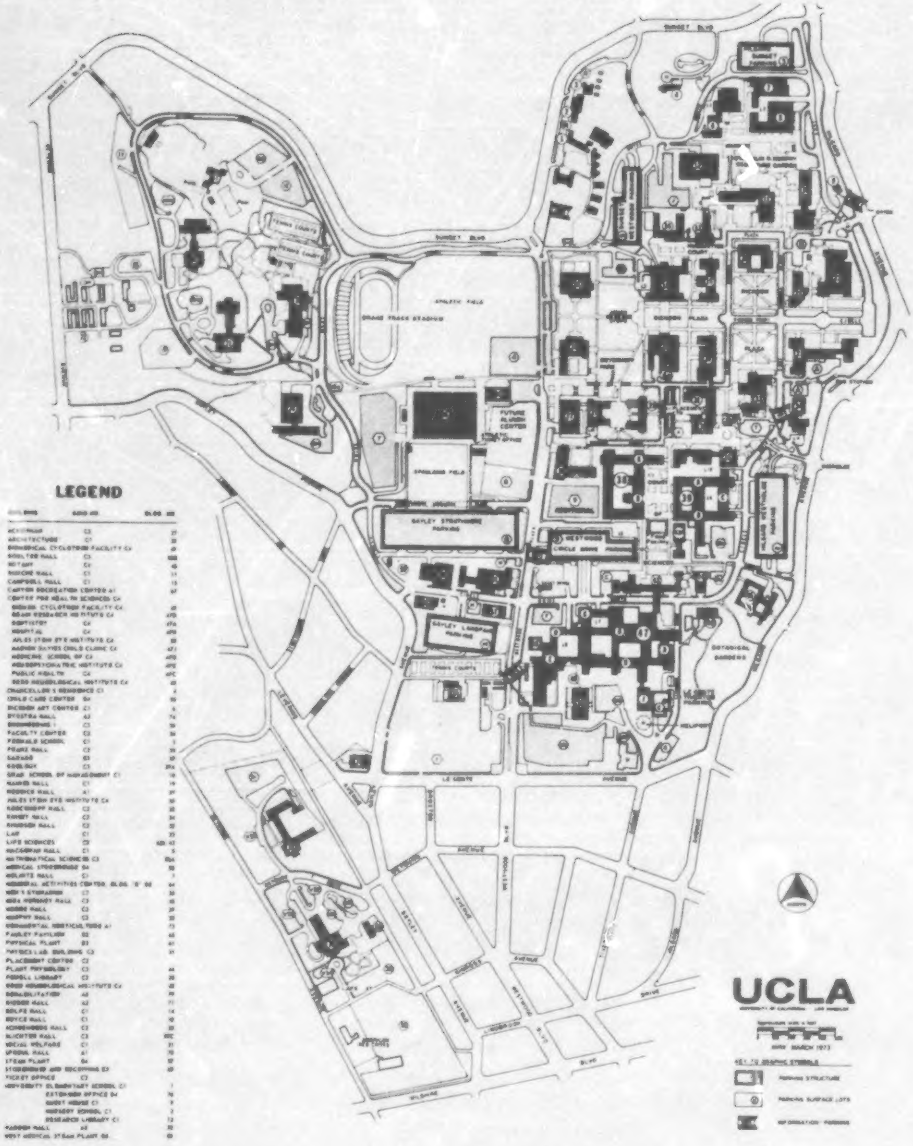
LOS ANGELES CAMPUS, VIEW OF WESTWOOD VILLAGE AND CAMPUS



View looking north.

MAP 12

LOS ANGELES CAMPUS


SUNSET BLVD
ATHLETIC FIELD
DRAKE TRACK STADIUM
SPAULDING FIELD
BOTANICAL GARDENS
LE CONTE AVENUE
WESTWOOD BLVD
WILSHIRE
LEGEND
UCLA

C. TRANSPORTATION ORIENTATION

More than half of the students attending the Los Angeles campus use cars to get to campus. A number of features of the campus environment and the campus itself encourages this car-orientation.

First, most of the housing in the campus environs is expensive single family residences or expensive apartments, which discourages students from living close to campus. Consequently, in 1971-72, as many as 58% of Los Angeles students lived three or more miles from campus and 68% lived more than one mile from campus. Of the 32% of students living within one mile of campus, half (16%) lived in University-owned residence halls on campus.

Second, the general car orientation of the Los Angeles area even discourages students living one to two miles from campus from walking or bicycling to campus. As a consequence, nearly half of the students living within one to two miles of campus drive to campus.

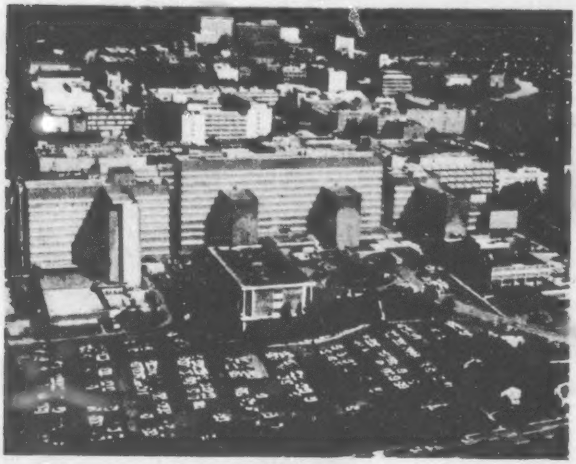
Third, campus policies encourage driving to campus by providing considerable parking on-campus for students, faculty and staff. In contrast to the other two urban campuses in the University--Berkeley and San Francisco--which provide parking for only a small percentage of the campus population, as shown in Map 12 and the aerial photograph, Los Angeles in 1971-72 provides 17,500 parking spaces on-campus--48 parking spaces for every 100 students, faculty and staff.

D. TRANSPORTATION MODES

1. The mean (average) distance of all student residences from campus was 6.73 miles, while the modal distance was 3 to 5 miles.

PHOTOGRAPH 10

LOS ANGELES CAMPUS, MAIN CAMPUS AREAS



View of Health Sciences Center looking north.

View of Pauley Pavillion looking southeast.

TABLE 41

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Los Angeles Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	4,282	4,282	2,676	4,817	4,015	4,015	2,676	26,763	6.73
Car Driver	342	685	883	2,361	2,610	2,931	2,167	11,979	10.53
Car Passenger	171	86	161	337	241	241	161	1,398	7.80
Car Pool	43	86	107	385	401	522	267	1,811	10.30
Motor Scooter or Cycle	86	128	161	289	161	80	27	982	4.93
Bicycle	300	342	321	385	80	0	0	1,428	1.99
Public Transportation	86	43	321	1,012	522	241	54	2,279	6.00
Walk	3,254	2,912	722	48	0	0	0	6,936	.39
Hitchhike	-	-	-	-	-	-	-	-	
TOTAL	4,282	4,282	2,676	4,817	4,015	4,015	2,676	26,763	6.73

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 42

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Los Angeles Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	4,282	4,282	2,676	4,817	4,015	4,015	2,676	26,763	6.73
Car Driver	8%	16%	33%	49%	65%	73%	81%	45%	10.53
Car Passenger	4	2	6	7	6	6	6	5	7.80
Car Pool	1	2	4	8	10	13	10	7	10.30
Motor Scooter or Cycle	2	3	6	6	4	2	1	3	4.93
Bicycle	7	8	12	8	2	0	0	5	1.99
Public Transportation	2	1	12	21	13	6	2	9	6.00
Walk	76	68	27	1	0	0	0	26	0.39
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	6.73 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

As shown in Table 42, in 1971-72, 8,564 students (32% of the enrollment of 26,763) lived on campus or within one mile of campus; 2,676 (10%) lived within 1 to 2 miles of campus; 4,816 (18%) lived within 3 to 5 miles; and 11,706 (40%) lived six or more miles from campus.

2. Driving is the preferred mode of transportation among the students on the Los Angeles campus.

As illustrated in Tables 41, 42 and 43, in 1971-72, six out of ten Los Angeles students used automobiles (were car drivers, car passengers or in car pools), nearly three out of ten walked, one in ten used public transportation, and the remainder used bicycles or motorcycles to get to campus.

3. Public transit was about as popular at Los Angeles as at the other urban campuses.

In 1971-72, public transit was used by 8% of the students at Berkeley, 12% of the students at San Francisco, and 9% of the students at Los Angeles.

4. Bicycles served as transportation for only a small number of Los Angeles students.

In 1971-72, 5% of students bicycled to campus. Most students who bicycled to campus lived within two miles of campus.

5. Walking was the most popular mode of travel of students living within one mile of campus.

Of all students living within one mile of campus, 68% walked, as did 27% of students living one to two miles from campus.

6. For students living three or more miles from campus, cars were the most common travel mode.

As illustrated in Table 42, among students living within one mile of campus, 20% used cars (including car passengers and car pools); among students living one to two miles from campus, 43% used cars. But, at 3 to 5 miles, 64% of students used cars; at 6 to 10 miles, 81% did; and at eleven or more miles, more than 95% used cars.

7. The relative popularity of the various transportation modes has remained notably stable at Los Angeles since 1967-68.

The greatest change in transportation patterns occurred between 1965-66 and 1967-68, when the number of students using public transit dropped by 531, from 2,791 (11%) to 2,260 (8%) and the number of students arriving at campus in car pools dropped 2,619 from 4,314 students (17% of the enrollment) to 1,695 (6%); at the same time, the number of drivers increased by 2,054 from 10,637 (42%) to 12,711 (45%); and the number of students walking to campus increased by 3,877 from 4,314 (17%) to 8,191 (29%).

8. The increase in the number of students walking coincided with a corresponding shift in the number and percentage of students living within one mile of campus.

In 1965-66, only 28% of students lived within one mile of campus, but in 1967-68, additional privately-owned student housing was opened and the percentage of students living within one mile of campus increased from 28% to 34%. This example illustrates that changes in student housing patterns directly affect students' choices of transportation modes. It suggests that if more students lived within one mile of campus, more students would walk to campus.

TABLE 43

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS

Los Angeles Campus

1965-66, 1967-68, 1969-70, and 1971-72

TRANSPORTATION MODE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students	25,375	100%	28,246	100%	29,595	100%	26,763	100%
Car Driver	10,657	42%	12,711	45%	13,021	44%	11,979	45%
Car Passenger	1,269	5	1,412	5	1,480	5	1,398	5
Car Pool	4,314	17	1,695	6	2,072	7	1,811	7
Motor Scooter or Cycle	1,776	7	1,695	6	1,480	5	932	3
Bicycle	254	1	282	1	296	1	1,428	5
Public Transportation	2,791	11	2,260	8	2,664	9	2,279	9
Walk	4,314	17	8,191	29	8,582	29	6,936	26
TOTAL	25,375	100%	28,246	100%	29,595	100%	26,763	100%

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

More important than the result of the housing shift at Los Angeles, is the 2,054 increase in the number of students driving cars to campus, the decrease of 2,619 students who previously came to campus in car pools, and the decrease of 531 students who used public transit during the period, 1965-66 to 1967-68. As part of an overall campus plan to build parking garages, the campus in 1966 opened a parking structure for 2,822 cars and in 1967 opened another structure for 2,000 cars. The sudden availability of these parking facilities was the single most important reason that the number of student cars coming to campus increased by 20%. The combined effect of the housing shift and the added parking explain the decrease of 3,619 students in car pools and the decrease of 531 in the number using public transit. (A photo of one of the new parking structures follows.)

9. The campus policy at Los Angeles which encourages and facilitates student car parking on campus, is also a policy which indirectly discourages students from using car pools or public transportation.

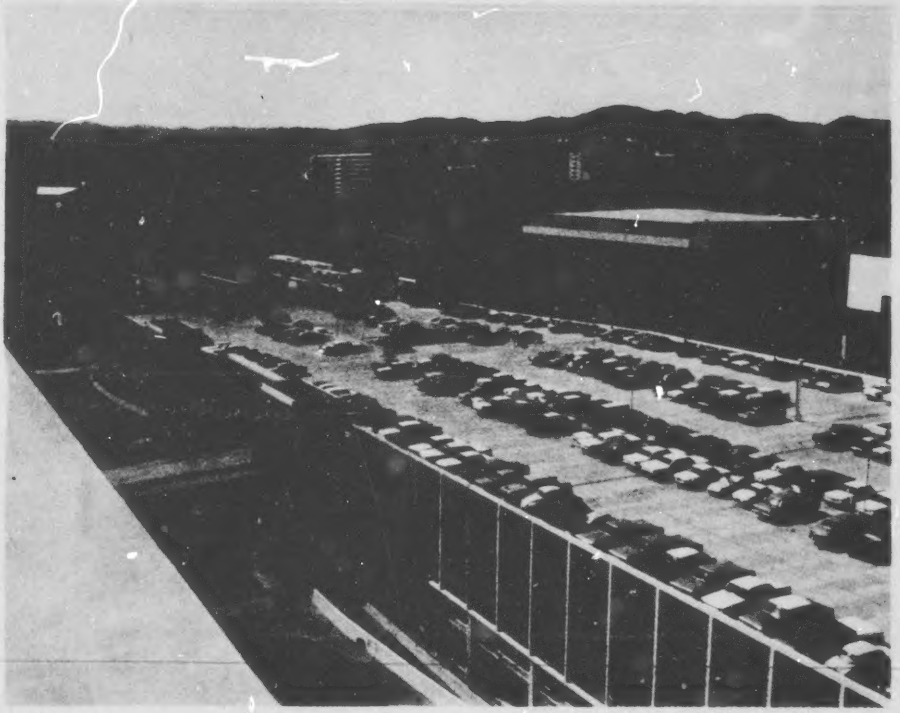
In the same way that it can be concluded that more students living within one mile of campus will result in more students walking, one can conclude that the more student car parking available on campus, the more students will drive to campus in lieu of using car pools or public transportation.

10. Although it would appear that bicycles might be replacing cars among students at Los Angeles, this is not the case; instead, the bicyclists most probably were former pedestrians.

During the period, 1969-70 to 1971-72, the number of students bicycling to campus increased by 1,132, from 296 (1% of all students) to 1,428 (5%). During the same period that bicyclists increased by 1,132, the

PHOTOGRAPH 11

LOS ANGELES CAMPUS, PARKING STRUCTURE "L"



View looking northwest, with Residence Halls in the background.

number of students walking to campus decreased by 1,646, from 8,582 (29% of all students in 1969-70) to 6,936 (26% of all students in 1971-72). Map 13 shows bicycle lots at Los Angeles. Additionally, during this period, the number of students using motorscooters or motorcycles decreased by 548 from 1,480 (5%) to 932 (3%).

E. VEHICLE OWNERSHIP

1. Reflecting the importance of car ownership in southern California, in 1971-72, the Los Angeles, Irvine, Riverside, and San Diego campuses had the highest rate of car ownership of all nine University of California campuses.

Approximately two-thirds of the students at these campuses owned cars. As shown in Tables 44 and 45, the average rate of car ownership at Los Angeles was 64%.

2. The percentage of students owning cars directly increased as students lived farther from campus.

At Los Angeles, three out of ten students living on campus owned cars, but eight out of ten students living three or more miles from campus owned cars.

3. Los Angeles had a slightly lower rate of bicycle ownership than the other automobile-oriented campuses.

Only 19% of students owned bicycles at Los Angeles, while approximately 30% of the students at Irvine, Riverside, and San Diego owned bicycles. This suggests that bicycling, even as a recreational activity, is perhaps less popular among students at Los Angeles than other campuses. It also suggests that policies designed to encourage bicycling to campus will probably have less impact at Los Angeles than other auto-oriented campuses.

TABLE 44

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Los Angeles Campus

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	4,282	4,282	2,676	4,817	4,015	4,015	2,676	26,763	6.73
Car	1,370	2,141	1,686	3,709	3,011	3,051	2,168	17,136	7.95
Motor Scooter or Cycle	128	171	187	385	241	161	80	1,353	6.34
Bicycle	771	899	723	1,156	723	522	294	5,088	5.46
None	2,270	1,627	723	819	843	923	562	7,767	5.32
TOTAL	4,539	4,838	3,319	6,069	4,818	4,657	3,104	31,344	
(Keep Both Car and Bicycle)	257	556	643	1,252	803	642	428	4,581	7.06

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 45

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Los Angeles Campus

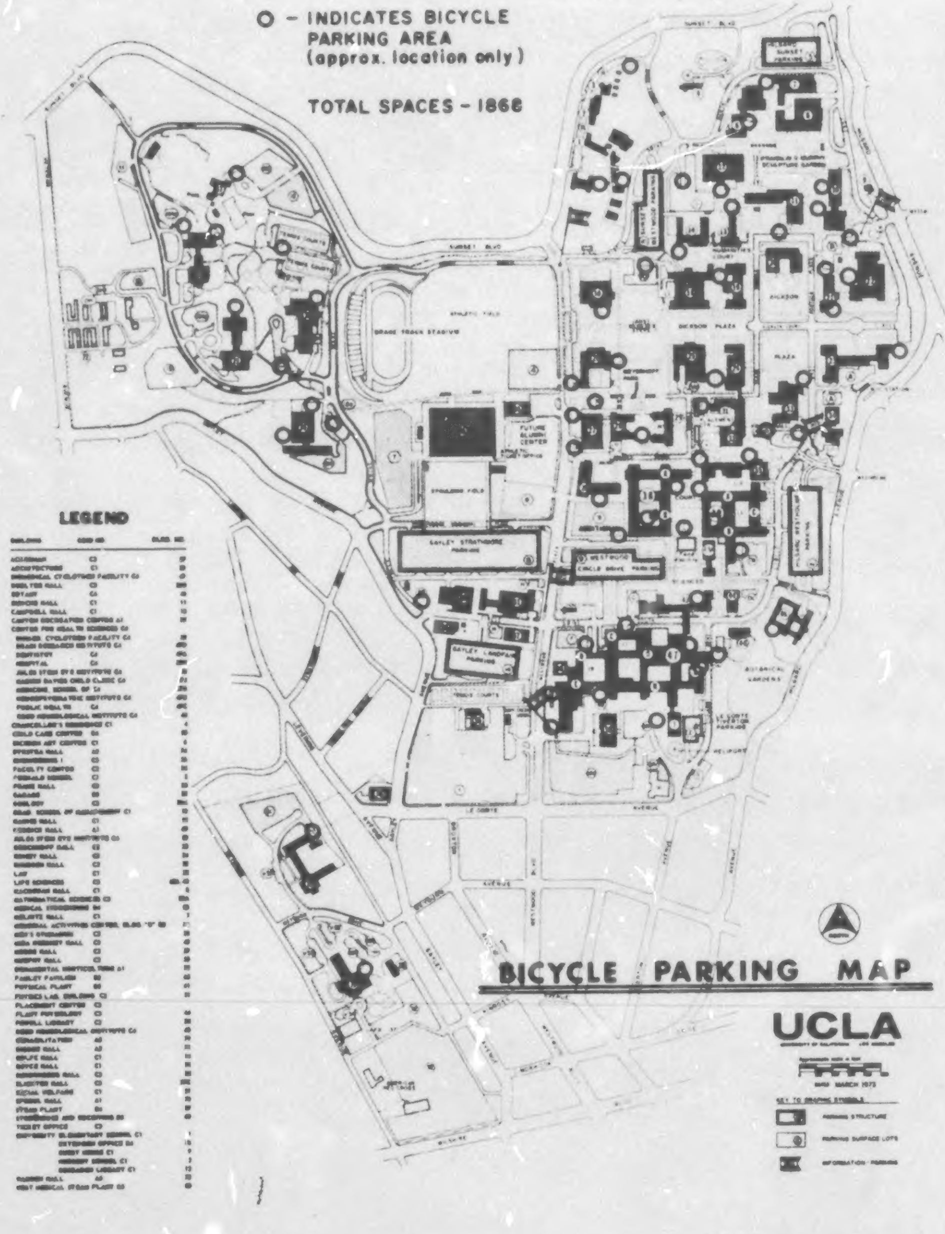
1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	4,282	4,282	2,676	4,817	4,015	4,015	2,676	26,763	6.73
Car	32%	50%	63%	77%	75%	76%	81%	64%	7.95
Motor Scooter or Cycle	3	4	7	8	6	4	3	5	6.34
Bicycle	18	21	27	24	18	13	11	19	5.46
None	53	38	27	17	21	23	21	29	5.32
TOTAL	106%	113%	124%	126%	120%	116%	116%	117%	
(Keep Both Car and Bicycle)	(6%)	(13%)	(24%)	(26%)	(20%)	(16%)	(16%)	(17%)	7.06 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning. Student Housing and Transportation Survey, 1971-72.

MAP 13

LOS ANGELES CAMPUS BICYCLE PARKING


O - INDICATES BICYCLE PARKING AREA (approx. location only)
TOTAL SPACES - 1866
LEGEND
SUNSET BLVD
ATHLETIC FIELD
PLAZA
BOTANICAL GARDENS
BICYCLE PARKING MAP
UCLA

4. At Los Angeles, bicycle ownership is relatively similar and constant among all students regardless of distance from campus.

For example, at Davis and Santa Barbara, campuses where bicycles dominate, the ownership rate is disproportionally higher among students living on-campus, or within cycling distance (1 to 2 miles). The highest ownership ratio at Los Angeles is among students living 1 to 2 miles, where 27% of the 2,676 students own bicycles and at 3 to 5 miles where 24% of the 4,817 students own bicycles. At the lesser distances within one mile, 18% to 21% of students owned bicycles; at the greater distances, more than six miles, 11% to 18% owned bicycles.

5. Over time, vehicle ownership patterns at Los Angeles have stayed relatively constant, with the greatest shift occurring in increased bicycle ownership.

As shown in Table 46, in 1967-68, 67% of the 28,246 students at Los Angeles owned cars; by 1971-72, this had dropped slightly to 64% of the 26,763 students. During the same period the number of bicycle owners increased by 3,111--from 1,977 (7% of the 1967-68 enrollment) to 5,088 (19% of the 1971-72 enrollment of 26,763).

6. The percentage of students owning cars varied significantly with academic standing.

Table 47 shows that 40% of lower-division, 66% of upper-division and 81% of graduate students own cars; 58% of single students and 83% of married students owned cars; 53% of women and 70% of men owned cars.

7. The percentage of students owning bicycles had little variation by class standing and none by marital status or sex.

TABLE 46

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE

Los Angeles Campus

1965-66, 1967-68, 1969-70, and 1971-72

VEHICLE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students			28,246	100%	29,595	100%	26,763	100%
Car	Not Available		18,925	67%	19,533	66%	17,136	64%
Motor Scooter or Cycle			2,260	8	2,072	7	1,353	5
Bicycle			1,977	7	2,368	8	5,088	19
None			8,191	29	8,582	29	7,767	29
TOTAL			31,353	111%	32,555	110%	31,344	117%
(Keep Both Car and Bicycle)			(3,107)	(11%)	(2,960)	(10%)	(4,581)	(17%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

TABLE 47

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY CLASS STANDING, BY MARITAL STATUS AND BY SEX

Los Angeles Campus

1971-72

VEHICLE	CLASS STANDING			MARITAL STATUS		SEX		ALL STUDENTS
	L. D.	U. D.	Grad.	Single	Married	Male	Female	
Number of Students	7,226	10,170	9,367	20,608	6,155	16,058	10,705	26,763
Car	40%	66%	81%	58%	83%	70%	53%	64%
Motor Scooter or Cycle	3	6	6	5	7	7	1	5
Bicycle	20	19	18	19	19	19	19	19
None	48	27	16	33	16	23	39	29
TOTAL	111%	118%	121%	115%	125%	119%	112%	117%
(Keep Both Car and Bicycle)	(11%)	(18%)	(21%)	(15%)	(25%)	(19%)	(12%)	(17%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

As shown in Table 47, 20% of lower-division, 15% of upper division and 18% of graduate students owned bicycles; 19% of all single students as well as 19% of all married students, and 19% of all male and 19% of all female students owned bicycles.

8. There was considerable variation among classes of students in the percentage of each without any vehicle (i.e., no car, no motorscooter and no bicycle).

In 1971-72, 48% of all lower-division, 27% of all upper-division and 16% of all graduate students at Los Angeles had no vehicles. Also, 17% of all Los Angeles students owned both a car and a bicycle. This dual vehicle ownership compares with an average of 23% for all nine University campuses.

F. VEHICLE USE

1. At Los Angeles, like the other automobile campuses, there was a high probability that a student who owned a car would use it for transportation to campus.

At both of the moderately automobile-oriented campuses--Los Angeles and Riverside--the probability of a student using the car he owned was less than at the completely-automobile-oriented campuses.

As shown in Table 48, 70% of students at Los Angeles (and 70% of Riverside students) used the cars they owned for transportation to campus, but 90% of the students at Irvine and San Diego who owned cars used them for transportation to campus. When this probability is subdivided according to distance, as shown in Table 48, it is apparent that although 50% of the 4,282 Los Angeles students living within one mile of campus owned cars, only 16% used their cars for transportation--equivalent to a 32% probability

TABLE 48

PROBABILITY OF VEHICLE OWNERS USING THEIR VEHICLES FOR TRANSPORTATION TO CAMPUS

Los Angeles Campus

1971-72

	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	Total/ Average
Number of Students	4,282	4,282	2,676	4,817	4,015	4,015	2,676	26,763
Percent who own cars	32%	50%	63%	77%	75%	76%	81%	64%
Percent who drive cars	8%	16%	33%	49%	65%	73%	81%	45%
Probability of car owners driving to campus	0.25	0.32	0.52	0.64	0.87	0.96	1.00	0.70
Percent who own bicycles	18%	21%	27%	24%	18%	13%	11%	19%
Percent who ride bicycles	7%	8%	12%	8%	2%	0%	0%	5%
Probability of bicycle owners riding to campus	0.39	0.38	0.44	0.33	0.11	0.00	0.00	0.26

[a] Estimated based on other campuses. Includes some students who drive cars owned by their families.

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

of use. However, among students living six or more miles from campus, the probability of car use by car owners was high regardless of campus--it was more than 90% at Los Angeles, over 95% at Riverside and San Diego, and almost 100% at Irvine.

XI. RIVERSIDE

A. SUMMARY

Riverside is a moderately-automobile-oriented campus because about half of the students enrolled there in 1971-72 used cars as their transportation to campus. One of the factors which promoted this orientation was the substantial number of students (4 out of 10) who lived three or more miles from campus, of whom the overwhelming percentage drove or came to campus as car passengers. This would be expected, because they lived beyond what is normally considered bicycling or walking distance, and one of the primary access routes to the campus is through an interchange which is dangerous for bicyclists and pedestrians. At the time of the study, there was no public transportation. As a further incentive to driving, Riverside has the highest ratio of parking spaces to students, faculty and staff of any of the University campuses.

For students living within one mile of campus, walking was the most popular mode, being used by over half the students. Bicycles were most heavily used up to two miles from campus, with 17% of the students using bicycles; this bicycle use was more than three times that of Los Angeles, the other moderately-automobile-oriented campus, primarily because of the lesser amount of traffic congestion in the Riverside environs. Between 1969-70 and 1971-72, there was a marked increase in the number of bicycles ridden to campus. The increased bicycle use resulted in a displacement of cars as a mode of transportation, apparently because of the combined effect of more students living closer to campus and being less likely to drive, and the general trend towards more bicycle usage, especially at the shorter distances from campus.

Among students living on campus, bicycle ownership was actually greater than car ownership, and the relatively high rate of ownership (40% to 50%) continued among students living up to two miles from campus. However, car ownership also began to climb immediately for students living off-campus, as over three-quarters of the students living beyond one mile owned cars.

Because the percentage of students owning both cars and bicycles increased, while the percentage of students with no vehicles remained constant, it appears that it was the car owners who were buying bicycles, possibly with an economy or ecology motive, while the pedestrians were content to continue walking.

In terms of class standing, marital status and sex, there were marked differences in car ownership rates. By contrast, although the ownership differences among classes of bicycle owners was not as pronounced as at the bicycle-oriented campuses, there was still a greater variation than at other auto campuses. This is reflected in relatively high use of bikes for transportation purposes, as Riverside had the highest probability of any except the bicycle-oriented campuses (Davis and Santa Barbara) that the bicycles owned by students would be used for transportation to campus. Consistent with Riverside's automobile orientation, there was in general a higher probability of students using their cars than their bikes, with the probability of car usage increasing with distance from the campus, and the probability of bicycle usage decreasing with distance.

B. BACKGROUND

The 1,100-acre Riverside campus and its surrounding areas were annexed to the City of Riverside in 1960 after preparation and approval of a Master Plan for the University community.

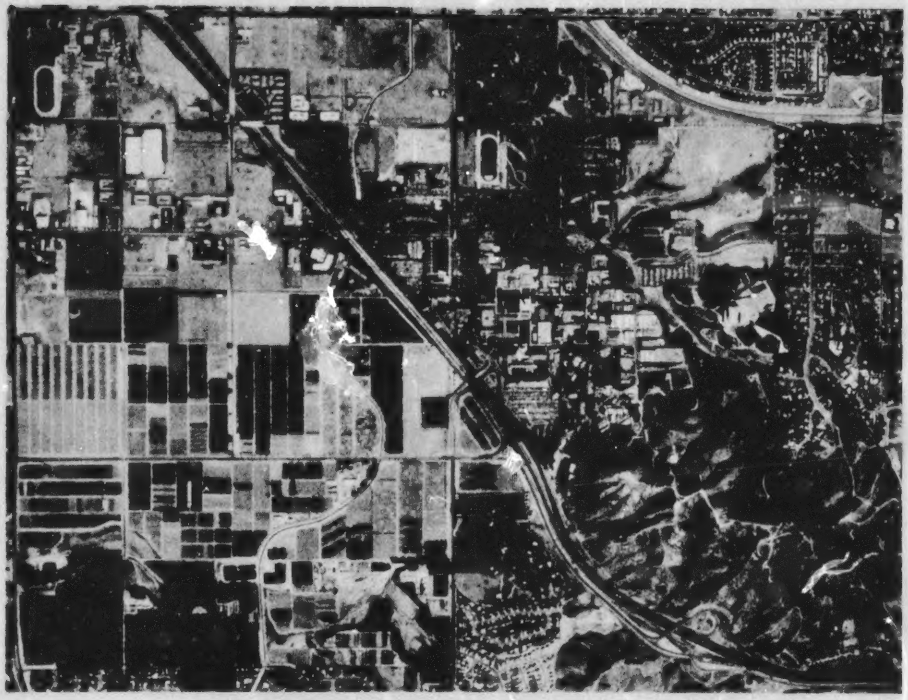
The environs contain a variety of land uses. A concentration of citrus groves is found northeast of the campus. However, such open use has given way during the last ten years to suburban developments, the most notable being development of 100 acres of land between the eastern city limits and Watkins Drive, primarily at single-family residential densities. Also, a large residential area south of campus has been developed. Located between Watkins and Big Springs Road are a recreation center and a neighborhood center. The most visible of intensive uses is the automobile-related commercial strip along University Avenue, the main entrance to the campus.

As shown in Map 12, University Avenue serves also as the main access to downtown Riverside three miles west of the campus. Escondido Freeway handles the traffic from the north and the south, which reaches the campus via a limited interchange with University Avenue and a perimeter road.

Zoning in the environs is predominantly residential and permits densities of two to seven dwelling units/net acre for single-family and up to 29 du/net acre for multi-family residences. The highest density zones, north, south and west of the academic core, permit various dwelling types. Zoning east of the campus is almost entirely single-family residential. Commercial zones permitting all types of commercial uses extend along both sides of University Avenue and may be found also in two areas north and south of the campus. A smaller commercial zone mainly for retail and personal services is located to the east.

PHOTOGRAPH 12

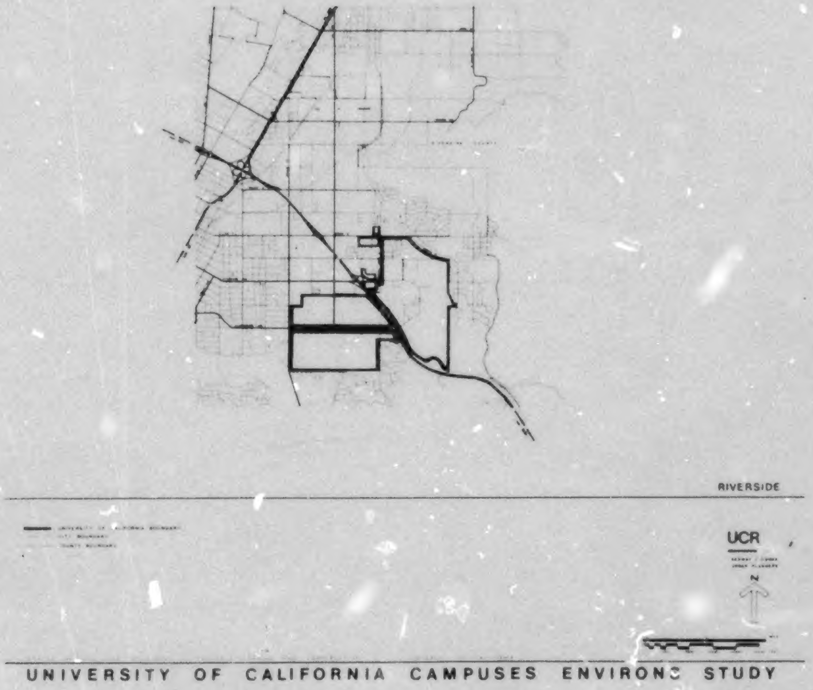
RIVERSIDE CAMPUS, AERIAL VIEW, 1973



Overhead view; north at top of page. Photograph by American Aerial Surveys, Inc.

MAP 14

RIVERSIDE CAMPUS ENVIRONS


RIVERSIDE
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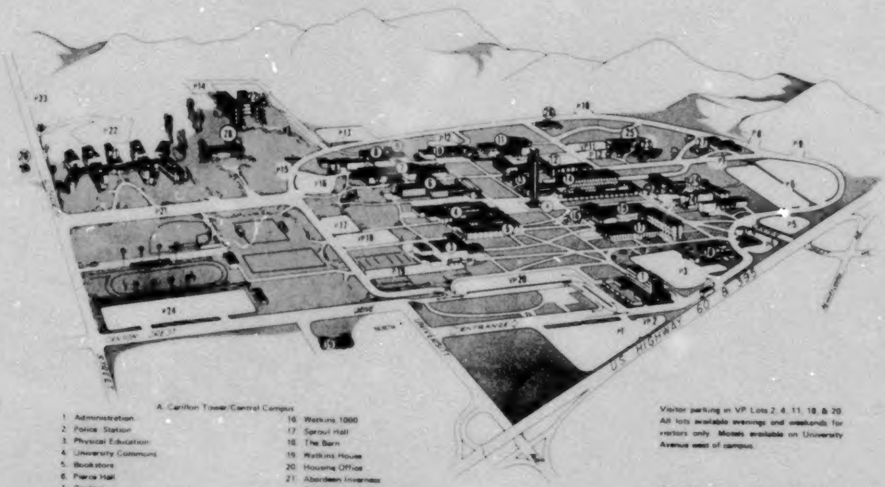
UNIVERSITY OF CALIFORNIA CAMPUSES ENVIRONS STUDY

MAP 15

RIVERSIDE CAMPUS OBLIQUE SKETCH

Campus Guide / University of California, Riverside



A. Carillon Tower/Central Campus

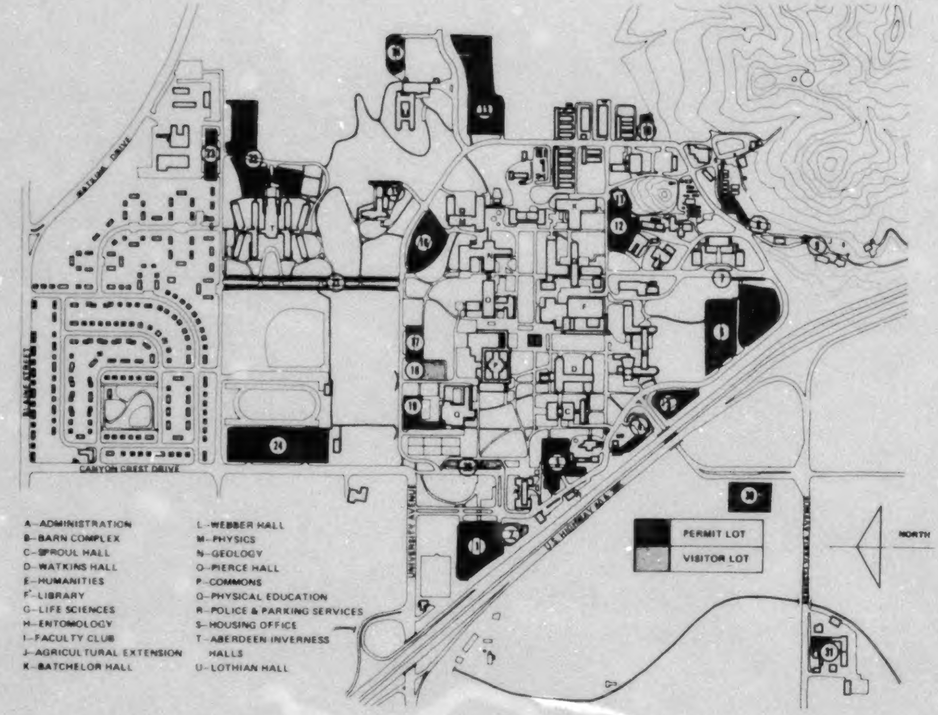
1	Administration
2	Police Station
3	Physical Education
4	University Commons
5	Bookstore
6	Pierce Hall
7	Geology
8	Physics
9	Physics 2000
10	Webber Hall
11	Batchelor Hall
12	Life Sciences
13	Life Sciences 1500
14	Library
15	Watkins Hall
16	Watkins 1000
17	Sproul Hall
18	The Barn
19	Watkins House
20	Housing Office
21	Aberdeen Inverness Residence Hall
22	Lothian Residence Hall
23	Faculty Club
24	Humanities University Theatre
25	Entomology
26	Fawcett Laboratory
27	Soils and Plant Nutrition
28	Veitch Health Service

Visitor parking in VP Lots 2, 4, 11, 18, & 20. All lots available evenings and weekends for visitors only. Motels available on University Avenue west of campus.

Visitor information: (714) 787-4531 Monday-Friday 8:00 a.m. - 5:00 p.m. Room 1101 Administration Building. After Hours Campus Police: 787-5222.

MAP 16

RIVERSIDE CAMPUS PARKING


WATKINS DRIVE
CANYON CREST DRIVE
UNIVERSITY AVENUE
U.S. HIGHWAY 60
24
PERMIT LOT
VISITOR LOT
NORTH
A–ADMINISTRATION
B–BARN COMPLEX
C–SPROUL HALL
D–WATKINS HALL
E–HUMANITIES
F–LIBRARY
G–LIFE SCIENCES
H–ENTOMOLOGY
I–FACULTY CLUB
J–AGRICULTURAL EXTENSION
K–BATCHELOR HALL
L–WEBBER HALL
M–PHYSICS
N–GEOLOGY
O–PIERCE HALL
P–COMMONS
Q–PHYSICAL EDUCATION
R–POLICE & PARKING SERVICES
S–HOUSING OFFICE
T–ABERDEEN INVERNESS HALLS
U–LOTHIAN HALL

C. TRANSPORTATION ORIENTATION

In the typology developed in this study, Riverside had been classified as a moderately-automobile-oriented campus because in 1971-72 about half the Riverside students used cars to arrive at campus. The nature of much of development of the area surrounding the Riverside campus has created four major reasons for the automobile orientation at the Riverside campus:

First, the inadequate number of student-oriented housing units in the campus environs means a significant number of students must live beyond walking or bicycling distance from campus. In 1971-72, approximately 40% of Riverside students lived three miles or more from the campus. More than three-fourths of these students drove to campus.

Second, the campus is bisected by the Escondido Freeway (US 395). To the west of the freeway are University agricultural research areas; to the east is the academic campus, including University-owned student housing. Traffic between the two must cross under the freeway; traffic to the campus from the west along University to north from the freeway, must pass through an inadequate interchange and underpass which is dangerous to pedestrians and to bicyclists.

Third, the lack of community services complementary to a University campus encourages students owning cars to drive to reach off-campus activities--housing, shopping, recreation, entertainment, and employment.

In addition to the above, as shown in Maps 13 and 14, the campus itself encourages a car orientation by providing ample parking for students driving to campus. The Riverside campus in 1971-72 provided 58 parking spaces for every 100 students, faculty and staff on the campus--this was the highest of any University of California campus.

D. TRANSPORTATION MODES

1. The mean (average) distance of all student residences from campus was 4.73 miles, while modal distance was within 1 to 2 miles.

As shown in Tables 49 and 50, in 1971-72, 2,486 students (43% of the enrollment) lived on-campus or within one mile of campus; 983 (1[illegible]%) lived within 1 to 2 miles of campus; 867 (15%) lived within 3 to 5 miles; and 1,446 (25%) lived six or more miles from campus.

2. Driving has been the preferred mode of transportation among students at the Riverside campus.

As illustrated in Tables 49, 50 and 51, in 1971-72, one-half of the Riverside students used automobiles (were car drivers, car passengers, or in car pools), one-quarter walked, not quite one-quarter bicycled, and the remainder used public transportation or came to campus by motor scooter or cycle.[1]

3. The means of transportation to campus at the Riverside and Los Angeles campuses were similar.

In 1971-72, approximately one-half of both Riverside and Los Angeles students used cars as transportation to campus, one-fourth walked, and one-fourth used other forms of transportation. The main difference in the transportation pattern of the two campuses was that bicycling was a more popular form of transportation at Riverside than at Los Angeles--17% of Riverside students bicycled to campus in 1971-72; 5% of Los Angeles students did so.

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[1] By 1973-74, according to preliminary data, slight changes occurred in Riverside student transportation patterns. Of all students, 56% used automobiles (46% drove and 10% were in car pools or were car passengers), 25% walked, 16% bicycled, 1% used public transportation, and 2% used motor scooters or motorcycles.

TABLE 49

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Riverside Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	1,272	1,214	983	867	463	578	405	5,782	4.73
Car Driver	127	207	502	625	360	480	344	2,645	8.10
Car Passenger	89	27	69	69	37	40	20	348	5.05
Car Pool	13	12	29	17	28	46	33	178	10.10
Motor Scooter or Cycle	13	12	29	35	19	6	4	118	4.45
Bicycle	280	340	246	95	19	0	0	980	1.09
Public Transportation	25	0	0	9	0	6	4	44	4.98
Walk	725	619	108	17	0	0	0	1,469	.37
Hitchhike	-	-	-	-	-	-	-	-	
TOTAL	1,272	1,214	983	867	463	578	405	5,782	4.73

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 50

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS
BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Riverside Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	1,272	1,214	983	867	463	578	405	5,782	4.73
Car Driver	10%	17%	51%	72%	78%	83%	85%	46%	8.10
Car Passenger	7	2	7	8	8	7	5	6	5.05
Car Pool	1	1	3	2	6	8	8	3	10.10
Motor Scooter or Cycle	1	1	3	4	4	1	1	2	4.45
Bicycle	22	28	25	11	4	0	0	17	1.09
Public Transportation	2	0	0	1	0	1	1	1	4.98
Walk	57	51	11	2	0	0	0	25	0.37
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	4.73 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

4. The automobile was the dominant means of transportation at Riverside because so many of the Riverside students (40%) lived three or more miles from campus, and more than 75% of those students drove to campus.

This is further illustrated in Tables 49 and 50.

5. Of those students who lived within one mile of campus, 28% bicycled and 51% walked; of those who lived 1 to 2 miles from campus, 25% bicycled and 11% walked.

6. Student interest in bicycling at Riverside developed largely in the period from 1969-70 to 1971-72.

As shown in Table 51, in 1969-70, only 363 students (7%) bicycled to campus; two years later, 980 students (17%) bicycled to campus. As the number of students bicycling to campus had increased, the number of students driving decreased. In spite of the enrollment increase of 599 students, the number of students who drove to campus declined by 154, from 2,799 students (54%) in 1969-70 to 2,645 students (46%) in 1971-72.

7. The shift from driving to bicycling resulted in two changes: first, more Riverside students lived closer to campus, and second, the shift from driving to bicycling among students who lived within two miles of campus.

University records indicate that between 1969-70 and 1971-72, the percentage of students living within two miles of campus increased from 54% to 58%. At the same time, the percentage of students driving to campus decreased from 31% to 24%, and the percentage of students bicycling to campus increased from 12% to 25%.

In contrast to Los Angeles, where less than 10% of the students who lived within two miles bicycled to campus, 25% of the Riverside students

TABLE 51

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS

Riverside Campus

1965-66, 1967-68, 1969-70, and 1971-72

TRANSPORTATION MODE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students	3,476	100%	4,034	100%	5,183	100%	5,782	100%
Car Driver	2,329	67%	2,017	50%	2,799	54%	2,645	46%
Car Passenger	278	8	282	7	363	7	348	6
Car Pool	139	4	121	3	155	3	178	3
Motor Scooter or Cycle	174	5	121	3	155	3	118	2
Bicycle	174	5	282	7	363	7	980	17
Public Transportation	0	0	41	1	104	2	44	1
Walk	382	11	1,170	29	1,244	24	1,469	25
TOTAL	3,476	100%	4,034	100%	5,183	100%	5,782	100%

Source: University of California, Office of the Assistant Vice President—Physical Planning, Student Housing and Transportation Survey, years indicated.

TABLE 52

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Riverside Campus

1971-72

	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								
VEHICLE	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	1,272	1,214	983	867	463	578	405	5,782	4.73
Car	534	729	699	711	366	503	344	3,886	5.49
Motor Scooter or Cycle	25	24	49	69	32	12	4	215	4.77
Bicycle	611	595	442	286	102	63	33	2,132	2.51
None	356	206	108	87	69	98	73	997	5.41
TOTAL	1,526	1,554	1,298	1,153	569	676	454	7,230	
(Keep Both Car and Bicycle)	254	340	315	286	106	98	49	1,448	3.67

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 53

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Riverside Campus

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	1,272	1,214	983	867	463	578	405	5,782	4.73
Car	42%	60%	71%	82%	79%	87%	85%	67%	5.49
Motor Scooter or Cycle	2	2	5	8	7	2	1	4	4.77
Bicycle	48	49	45	33	22	11	8	37	2.51
None	28	17	11	10	15	17	18	17	5.41
TOTAL	120%	128%	132%	133%	123%	117%	112%	125%	
(Keep Both Car and Bicycle)	(20%)	(28%)	(32%)	(33%)	(23%)	(17%)	(12%)	(25%)	3.67 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

did so. This was in part due to the flat topography of the Riverside environs, and also to the smaller degree of bicycle-automobile conflict at Riverside than at Los Angeles.

E. VEHICLE OWNERSHIP

1. Vehicle ownership at Riverside is higher than University-wide averages.

In 1971-72, and as shown in Tables 52 and 53, two out of three students (67%) at Riverside owned cars and slightly more than one out of three students (37%) owned bicycles.

2. At Riverside, as with the other automobile-oriented campuses, car ownership was substantial among all students regardless of how far they lived from campus, but bicycle ownership was substantial only among students who lived within two miles of the campus.

As illustrated in Tables 52 and 53, more than three out of four students who lived beyond two miles from campus owned cars, but only one out of five students who lived beyond two miles of campus owned a bicycle. By contrast, only one out of two students who lived within a mile of campus kept a car; this same ownership held for bicycles as well.

3. In the two years between 1969-70 and 1971-72, the percentage of students owning cars dropped slightly while the percentage of students owning bicycles grew markedly.

As illustrated in Table 64, car ownership dropped from 70% to 67% and bicycle ownership increased from 21% to 37%.

TABLE 54

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE

Riverside Campus

1965-66, 1967-68, 1969-70, and 1971-72

VEHICLE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students			4,034	100%	5,183	100%	5,782	100%
Car	Not Available		2,743	68%	3,629	70%	3,886	67%
Motor Scooter or Cycle			242	6	259	5	215	4
Bicycle			928	23	1,088	21	2,132	37
None			807	20	1,088	21	997	17
TOTAL			4,720	117%	6,064	117%	7,230	125%
(Keep Both Car and Bicycle)			(686)	(17%)	(881)	(17%)	(1,448)	(25%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

4. Because of the increase in bicycle ownership, the percentage of students owning both cars and bicycles increased.

In 1967-68, 17% of students owned both cars and bicycles; in 1971-72, 25% did so.

5. The percentage of students without any vehicles dropped slightly.

In 1967-68, 20% of Riverside students did not own a vehicle; in 1971-76, 17% did not own one. This suggests that most of the increase in bicycle ownership in the two-year period was among students who already owned cars.

6. At Riverside, as at all campuses with the exception of Irvine, the percentage of students owning cars increased with student class standing, while the percentage of students owning bicycles remained constant or decreased with class standing.

For example, in 1971-72, among Riverside lower-division students, 47% owned cars and 43% owned bicycles; among upper-division students, 73% owned cars and 35% owned bicycles; among graduate students 84% owned cars, but only 32% owned bicycles.

Thus, Riverside policies which encourage automobiles would benefit upper-division and graduate students more than lower-division students, while policies which encourage bicycles would benefit all students, regardless of class standing.

7. Married students were more likely to own cars and less likely to own bicycles than single students.

As Table 55 illustrates, 88% of married students owned cars and 58% of single students owned cars; 33% of married students owned bicycles and 39% of single students owned bicycles. Men were more likely to own

TABLE 55

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY CLASS STANDING, BY MARITAL STATUS AND BY SEX

Riverside Campus

1971-72

VEHICLE	CLASS STANDING			MARITAL STATUS		SEX		ALL STUDENTS
	L. D.	U. D.	Grad.	Single	Married	Male	Female	
Number of Students	2,024	2,486	1,272	4,386	1,396	3,411	2,371	5,782
Car	47%	73%	84%	58%	88%	73%	54%	67%
Motor Scooter or Cycle	1	5	7	3	7	5	1	4
Bicycle	43	35	32	39	33	32	45	37
None	26	15	11	21	11	17	22	17
TOTAL	117%	128%	134%	121%	139%	127%	122%	125%
(Keep Both Car and Bicycle)	(17%)	(28%)	(34%)	(21%)	(39%)	(27%)	(22%)	(25%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

TABLE 56

PROBABILITY OF VEHICLE OWNERS USING THEIR VEHICLES FOR TRANSPORTATION TO CAMPUS

Riverside Campus

1971-72

	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	Total/ Average
Number of Students	1,272	1,214	983	867	463	578	405	5,782
Percent who own cars	42%	60%	71%	82%	79%	87%	85%	67%
Percent who drive cars	10%	17%	51%	72%	78%	83%	85%	46%
Probability of car owners driving to campus	0.24	0.28	0.72	0.88	0.99	0.95	1.00	0.69
Percent who own bicycles	48%	49%	45%	33%	22%	11%	8%	37%
Percent who ride bicycles	22%	28%	25%	11%	4%	[illegible]	0%	17%
Probability of bicycle owners riding to campus	0.46	0.57	0.56	0.33	0.18	0.00	0.00	0.46

[a] Estimated based on other campuses. Includes some students who drive cars owned by their families.

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

cars and less likely to own bicycles than women; 73% of men and 54% of women owned cars; and 32% of men and 45% of women owned bicycles.

F. VEHICLE USE

1. At Riverside, as at other automobile-oriented campuses, a high percentage of students who owned cars used them as transportation to campus but a lower percentage of students who owned bicycles used them as transportation to campus.

On the average, in 1971-72, there was a probability of 0.69 (69%) that students who owned cars would drive to campus and a probability of 0.46 (46%) that students who owned bicycles would ride to campus.

As shown in Table 56, the highest bicycle riding probabilities occurred within two miles of campus. Of students who lived within two miles and had bicycles, 56% rode their bicycles. Among automobile owners, 72% of the students lived within 1 to 2 miles drove. As distance of student residence from campus increased, so did the probability of automobile use. More than 90% of the students who lived three or more miles from campus and owned cars drove their cars to campus.

XII. SAN DIEGO

A. SUMMARY

San Diego falls into the heavily-automobile-oriented category because during 1971-72 nearly three-quarters of its students used cars for transportation to campus. Most of the other students walked, and the rest rode bicycles or came by public transportation. The two main factors causing this dependence on cars was the shortage of private housing for students close to campus (40% of the students lived over six miles from campus in 1971-72), and the campus policy which has accepted the automobile and thus has provided adequate parking rather than promoting bike paths or public transportation.

As with other campuses, students' choices of transportation varied with the distance of their residences from the campus. Of those students living on the San Diego campus, half drove to campus and thus had cars at their campus residences. The percentage of drivers remained equally high for students living up to two miles from campus and then jumped up to 90% of those living beyond two miles. However, the relatively high proportion of students who come to the San Diego campus as auto passengers suggests that there would be a ready market for public transit.

Walking was fairly popular for students living both on campus and within one mile; slightly over one-third of those students were pedestrians. The peak popularity of bicycles came between one and two miles but even then they were only used by one in five students.

Although only one in three students owned bicycles in 1971-72, this represented a doubling of the bike ownership rate over the previous four years. This was in contrast to car ownership which, while at a relatively high level, had remained fairly stable. Students were also four times more likely to use the cars they owned than their bicycles.

While car ownership rates varied significantly with class level, sex and marital status, bicycle ownership did not, which was consistent with other campuses at which recreational use seemed to be a stronger influence than transportation.

B. BACKGROUND

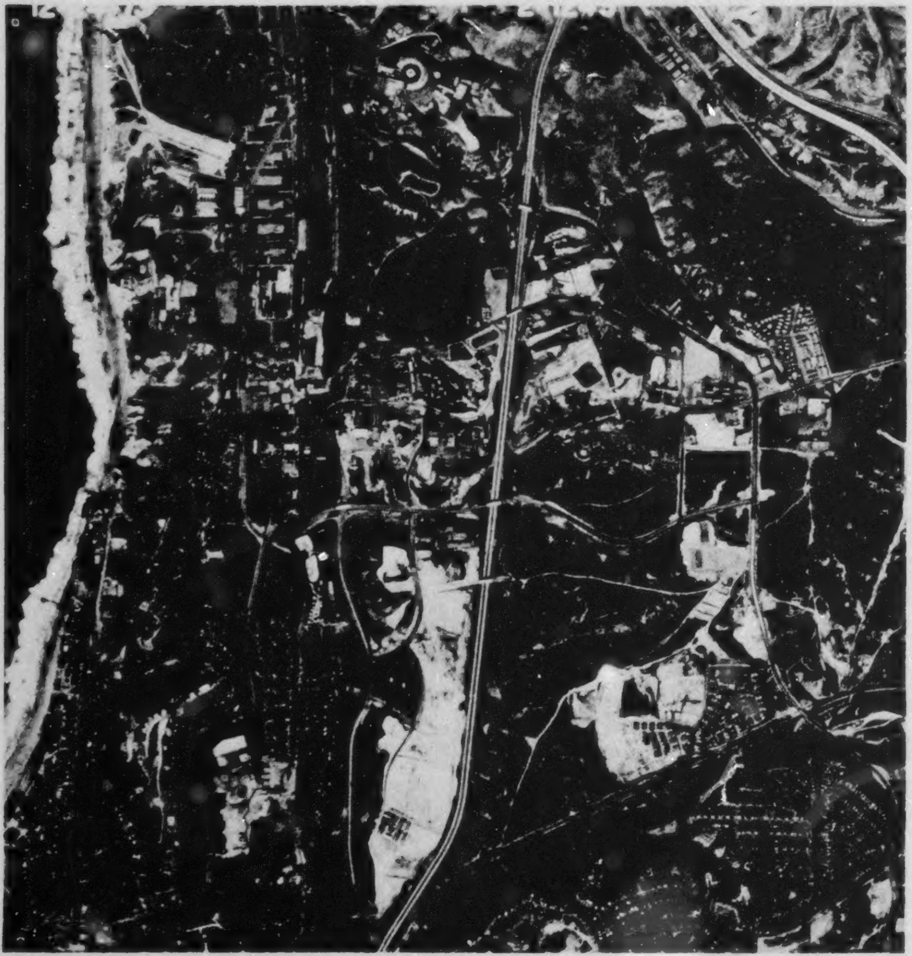
The San Diego campus, one of the three new campuses of the University of California (Irvine and Santa Cruz are the other two), first opened to undergraduates in fall 1964. In 1965-66, enrollment was 1,357 students; by 1971-72, it had increased to 6,175.

The 1,250-acre San Diego campus is within the city limits of San Diego. The most important land uses in the campus environs are Gulf General Atomic and a city-owned scientific research park on the north; Scripps Memorial Hospital, La Jolla County Day School, and Control Data on the northeast; Salk Institute for Biological Studies on the west; and the La Jolla residential areas to the south and southwest and around the Scripps Institution of Oceanography. Motel-hotel facilities on the 300-acre Villa La Jolla development are located south of the campus, and the Torrey Pines Golf Course and State Park is to the north and along the Pacific Ocean. Most of the City of San Diego's urban areas are south of the campus.

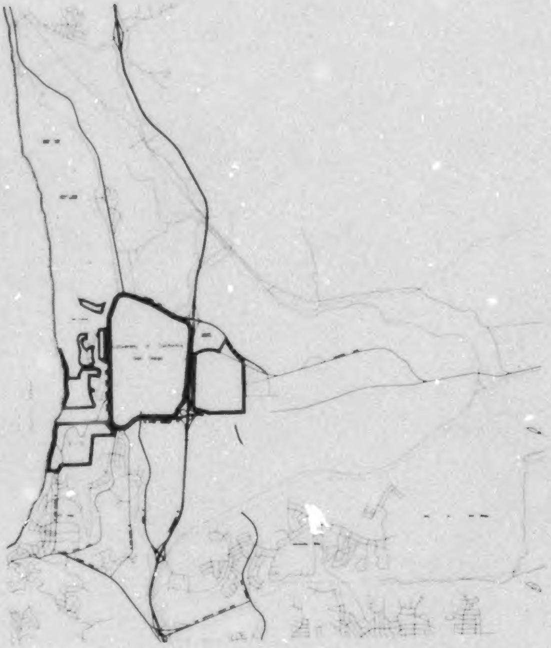
The campus is located in the San Diego metropolitan growth corridor, as shown in the aerial photograph and in Map 17. The campus and its environs are served mainly by Interstate 5, and secondarily by expressways and connectors carrying traffic from several directions.

PHOTOGRAPH 13

SAN DIEGO CAMPUS, AERIAL VIEW, 1972



Overhead view; north at top of page.



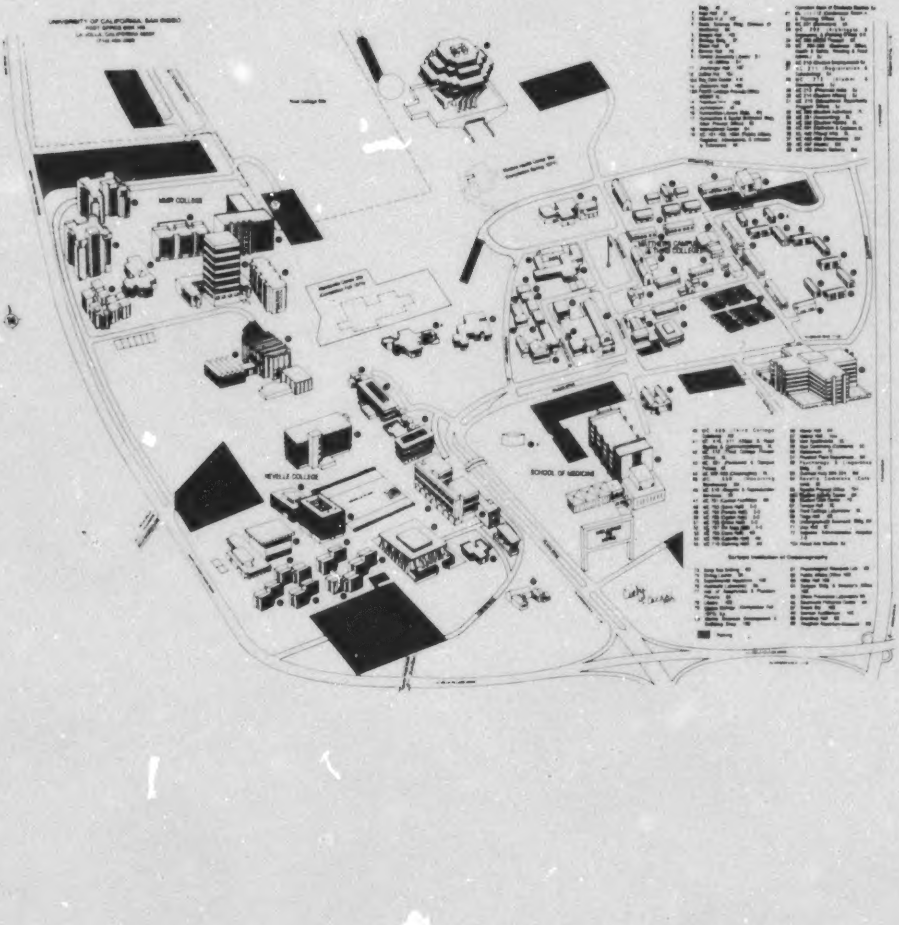
UNIVERSITY OF CALIFORNIA BOUNDARY
CITY BOUNDARY
COUNTY BOUNDARY
UCSD

SAN DIEGO

UNIVERSITY OF CALIFORNIA CAMPUSES ENVIRONS STUDY

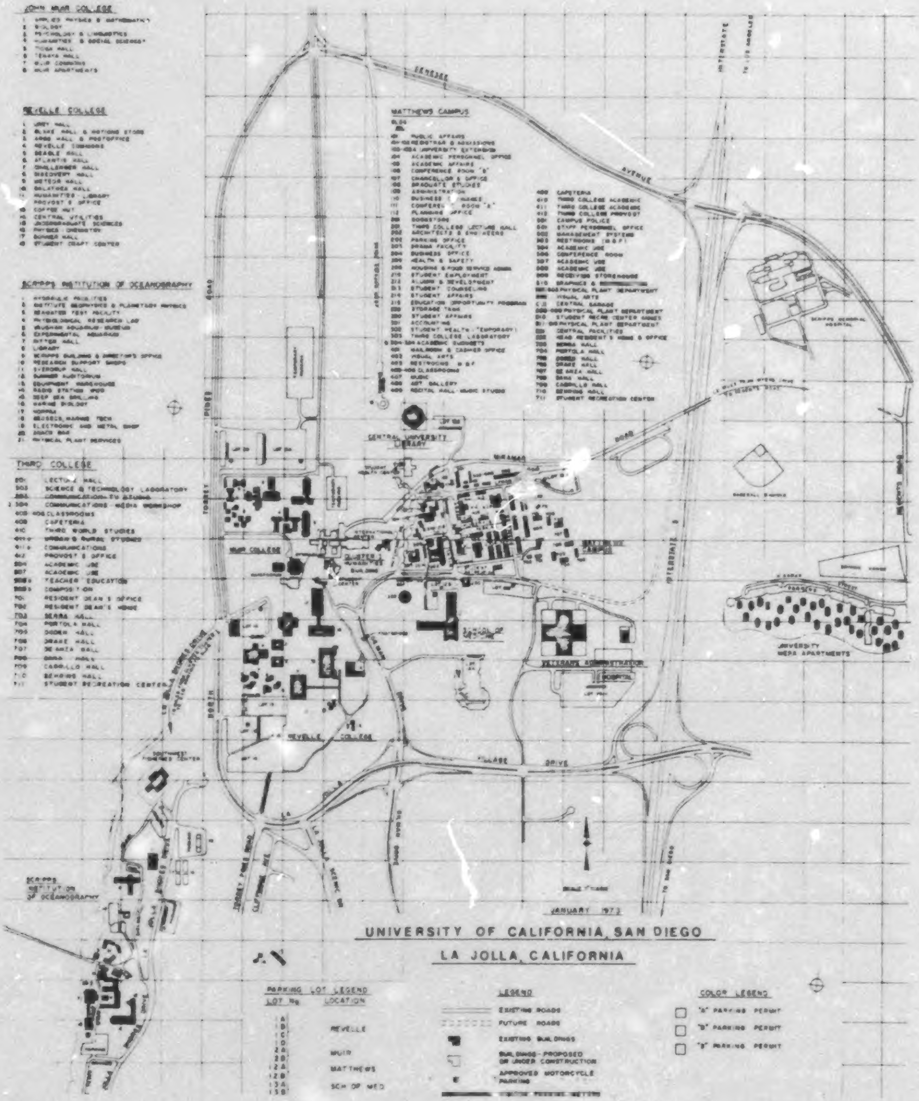
MAP 18

SAN DIEGO CAMPUS OBLIQUE SKETCH


UNIVERSITY OF CALIFORNIA, SAN DIEGO
MUIR COLLEGE
REVELLE COLLEGE
SCHOOL OF MEDICINE

MAP 19

SAN DIEGO CAMPUS


JOHN MUIR COLLEGE
REVELLE COLLEGE
SCRIPPS INSTITUTION OF OCEANOGRAPHY
THIRD COLLEGE
201 LECTURE HALL
203 SCIENCE & TECHNOLOGY LABORATORY
304 COMMUNICATIONS MEDIA WORKSHOP
400 CAFETERIA
410 THIRD WORLD STUDIES
412 PROVOST'S OFFICE
506 ACADEMIC USE
507 ACADEMIC USE
701 RESIDENT DEAN'S OFFICE
702 RESIDENT DEAN'S HOME
703 SERRA HALL
704 PORTOLA HALL
705 OJOEN HALL
706 DRAKE HALL
707 DE ANZA HALL
709 CABRILLO HALL
710 BEHRING HALL
711 STUDENT RECREATION CENTER
MATTHEWS CAMPUS
CENTRAL UNIVERSITY LIBRARY
MUIR COLLEGE
REVELLE COLLEGE
VETERANS ADMINISTRATION HOSPITAL
UNIVERSITY MESA APARTMENTS
GENESEE AVENUE
INTERSTATE 5
TO LOS ANGELES
TO SAN DIEGO
TORREY PINES ROAD
NORTH TORREY PINES ROAD
LA JOLLA SHORES DRIVE
LA JOLLA VILLAGE DRIVE
MIRAMAR ROAD
SCRIPPS INSTITUTION OF OCEANOGRAPHY
JANUARY 1973
UNIVERSITY OF CALIFORNIA, SAN DIEGO
LA JOLLA, CALIFORNIA
PARKING LOT LEGEND
LOT No LOCATION
1A 1B 1C 1D REVELLE
2A 2B MUIR
12A 12B MATTHEWS
13A 13B SCH OF MED
LEGEND
EXISTING ROADS
FUTURE ROADS
EXISTING BUILDINGS
BUILDINGS - PROPOSED OR UNDER CONSTRUCTION
APPROVED MOTORCYCLE PARKING
COLOR LEGEND
"A" PARKING PERMIT
"B" PARKING PERMIT
"S" PARKING PERMIT

Because much of the environs is still undeveloped, community facilities are lacking and major existing recreational facilities are not easily accessible from the main campus.

The shortage of student housing as well as housing for low-income staff members of the two hospital facilities close to the campus (Scripps Memorial and Veterans Administration) and of the University's School of Medicine is a serious problem. A related concern is the ability of the campus, the city, and major private environs developers to coordinate their efforts, particularly with regard to the disposal and development of the extensive city-owned lands.

The zoning in the environs is almost entirely single-family residential, except for a large scientific research zone north of the campus. The lowest-density zones are in two areas to the south. In the east, west, and south sections, the only exceptions to the single-family residential zoning (maximum density permitted: 8 dwelling units/net acre) are relatively small multi-family zones near La Jolla Village Drive and Miramar Road (maximum density: 43 dwelling units/net acre). The only commercial zone--south of La Jolla Village Drive--is primarily for the traveling motorist or tourist. One other smaller scientific research zone is located east of the campus and south of Miramar Road.

Important changes in the circulation pattern are being or will be made, as shown in Map 17. These include the recent completion of Interstate 805, a proposed location of a cloverleaf at La Jolla Village Drive, an already completed extension of Genesee Avenue to link the campus to existing areas of San Diego and a proposed open space bikeway system throughout the environs and beyond.

C. ORIENTATION

The San Diego campus is located fifteen miles north of downtown San Diego and only a few minutes away from the exclusive residential community of La Jolla. Most of the students attending the San Diego campus use cars to get to campus. This reliance on the automobile can be related to a number of features of the campus and its surrounding community.

First, the lack of privately-owned student housing in proximity to campus and the region serving aspect of the campus means that most students live beyond walking or bicycling distance of campus. In 1971-72, approximately 51% of students lived more than six miles from campus. Because of inadequate public transit, most of these students used cars to get to and from campus.

Second, because the land immediately surrounding the campus is undeveloped, the campus environs encourages an automobile orientation. Especially for students on-campus, the distance from campus to other activities forces students to drive to reach off-campus activities such as work, shopping, recreation, and entertainment.

Finally, campus policy accepts a car orientation. As shown in Maps 18 and 19, cars have been recognized as essential transportation to and from campus, and the campus has generally responded to the need for convenient parking on campus, rather than advocating alternative transportation systems.

To date, a comprehensive transportation and circulation plan for the campus has not been explored, although some campus efforts toward the development of a personal rapid transit (PRT) between the campus and its environs has been suggested.

TABLE 57

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

San Diego Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	2,161	494	371	679	1,297	864	309	6,175	5.55
Car Driver	540	158	167	428	947	673	247	3,160	8.10
Car Passenger	475	79	37	95	168	78	16	948	3.57
Car Pool	43	15	11	34	65	78	40	286	9.76
Motor Scooter or Cycle	22	10	11	34	52	17	3	149	6.08
Bicycle	173	35	78	54	39	9	0	388	2.07
Public Transportation	130	15	26	27	26	9	3	236	2.42
Walk	778	182	41	7	0	0	0	1.008	.28
Hitchhike	-	-	-	-	-	-	-	-	
TOTAL	2,161	494	371	679	1,297	864	309	6,175	5.55

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 58

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

San Diego Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	2,161	494	371	679	1,297	864	309	6,175	5.55
Car Driver	25%	32%	45%	63%	73%	78%	80%	51%	8.10
Car Passenger	22	16	10	14	13	9	5	15	3.57
Car Pool	2	3	3	5	5	9	13	5	9.76
Motor Scooter or Cycle	1	2	3	5	4	2	1	3	6.08
Bicycle	8	7	21	8	3	1	0	6	2.07
Public Transportation	6	3	7	4	2	1	1	4	2.42
Walk	36	37	11	1	0	0	0	16	0.28
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	5.55 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

In summary, the absence of a student housing market near the campus, the lack of urban development complementary to the campus, the low density of the campus and the campus' accommodation of cars without a corresponding emphasis on other transportation forms, have encouraged a car orientation at the San Diego campus.

D. TRANSPORTATION MODES

1. The mean (average) distance of all student residences from campus was 5.55 miles, while the modal distance was 3 to 5 miles.

As shown in Table 58, in 1971-72, 2,655 students (43% of the enrollment of 6,175) lived on-campus or within one mile of campus; 371 (6%) lived within 1 to 2 miles of campus; 679 (11%) lived within 3 to 5 miles; and 2,470 (40%) lived six or more miles from campus.

2. San Diego, like Irvine, has been classified as a heavily automobile-oriented campus.

As illustrated in Tables 57 and 58, in 1971-72 approximately 7 out of 10 San Diego students used cars to travel to campus. Of the students who did not use cars as their mode of travel to campus nearly 2 in 10 walked to campus and less than 1 in 10 bicycled, while the remainder used public transportation or motorcycles or motor scooters.

3. The San Diego campus--isolated from privately-provided student housing, restaurants and other commercial services and recreational activities--requires students to be highly dependent on cars to reach these activities.

As a consequence, not only do students who live beyond walking and bicycling distance from campus drive to campus, but students living in

TABLE 59

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS

San Diego Campus

1965-66, 1967-68, 1969-70, and 1971-72

TRANSPORTATION MODE	1965-66 Students	1965-66 Percent	1967-68 Students	1967-68 Percent	1969-70 Students	1969-70 Percent	1971-72 Students	1971-72 Percent
Number of Students	1,357	100%	2,988	100%	4,764	100%	6,175	100%
Car Driver	909	67%	1,076	36%	2,525	53%	3,160	51%
Car Passenger	109	8	508	17	619	13	948	15
Car Pool	163	12	60	2	191	4	286	5
Motor Scooter or Cycle	54	4	149	5	143	3	149	3
Bicycle	54	4	120	4	191	4	388	6
Public Transportation	27	2	209	7	333	7	236	4
Walk	41	3	866	29	762	16	1,008	16
TOTAL	1,357	100%	2,988	100%	4,764	100%	6,175	100%

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

University housing on campus or within one mile of campus also create considerable traffic by driving to and from campus and the environs.

For example, Table 58 shows that among 2,161 students living in housing on campus, 1,058 students (51%) used cars (25% drove and 24% were in car pools or were car passengers), while only 778 (36%) students walked.

This use of cars seems surprising. It suggests that some students living on campus used their cars to get to their campus residence from their permanent home, and it also suggests that some on-campus students drove to and from campus in connection with other non-academic activities.

4. *Students at San Diego who live on-campus generate nearly as much traffic as students who do not.*

Most students living off-campus used cars to get to campus. Among the 494 students living within one mile, 51% (252) used cars to travel to campus (32% drove and 19% were in car pools or were car passengers) while 7% of students bicycled and 37% walked. At a distance of 1 to 2 miles, 58% of the 371 students arrived at campus in automobiles, while 21% bicycled and 11% walked.

Slightly more than one-half of the San Diego students lived more than two miles away, and of these, 90% used cars to get to campus.

5. *During the four-year period, 1967-68 to 1971-72, the campus doubled in enrollment, while the number of students arriving at campus by automobile more than doubled.*

Table 59 describes student transportation modes most often used to or from campus from 1965-66 to 1971-72. Setting aside the 1965-66 data, taken when the campus had just opened and the student housing on-campus was not complete, and beginning with 1967-68, 1,644 students (55% of the enrollment of 2,988) arrived at campus by automobile; by 1971-72 the number arriving by automobile had increased by 2,750 to 4,394 (72% of the enrollment of 6,175). Thus of the enrollment increase of 3,187, more than 86% (2,750) chose to come to campus by car.

6. Aside from the continued reliance on the automobile, there were few significant transportation mode changes at San Diego between 1967-68 and 1971-72.

Due to lack of student residential facilities on or near campus, the absolute number of students walking remained stable between 800 and 1,000; however, as enrollment increased, the percentage of students walking decreased from 29% to 16%.

E. VEHICLE OWNERSHIP

1. Vehicle ownership patterns were similar to University-wide average.

As illustrated in Tables 60, 61, and 62, in 1971-72, 6 out of 10 students at San Diego owned a car. About three out of ten students owned a bicyle and about three out of ten students did not own any vehicle. One out of five owned both a car and a bicycle.

2. As with all campuses, except Irvine, the percentage of students owning cars increased directly with the distance of student residence from campus.

Car ownership ranged from rates of 67% among all students living within 3 to 5 miles of campus, to 80% of all students living 20 miles from campus.

TABLE 60

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

San Diego Campus

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	2,161	494	371	679	1,297	864	309	6,175	5.55
Car	800	252	264	455	999	700	247	3,717	6.33
Motor Scooter or Cycle	43	10	26	48	52	26	3	208	6.20
Bicycle	865	173	141	197	233	103	13	1,725	3.52
None	756	138	70	176	285	199	71	1,695	6.26
TOTAL	2,464	573	501	876	1,569	1,028	334	7,345	
(Keep Both Car and Bicycle)	303	79	130	197	272	164	25	1,170	5.45

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 61

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

San Diego Campus

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	2,161	494	371	679	1,297	864	309	6,175	5.55
Car	37%	51%	71%	67%	77%	81%	80%	60%	6.33
Motor Scooter or Cycle	2	2	7	7	4	3	1	3	6.20
Bicycle	40	35	38	29	18	12	4	28	3.52
None	35	28	19	26	22	23	23	27	6.26
TOTAL	114%	116%	135%	129%	121%	119%	108%	118%	
(Keep Both Car and Bicycle)	(14%)	(16%)	(35%)	(29%)	(21%)	(19%)	(8%)	(18%)	5.45 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 62

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE

San Diego Campus

1965-66, 1967-68, 1969-70, and 1971-72

VEHICLE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students			2,998	100%	4,764	100%	6,175	100%
Car	Not Available		1,703	57%	2,763	58%	3,717	60%
Motor Scooter or Cycle			149	5	238	5	208	3
Bicycle			389	13	762	16	1,725	28
None			986	33	1,620	34	1,695	27
TOTAL			3,227	108%	5,383	113%	7,345	118%
(Keep Both Car and Bicycle)			(239)	(8%)	(619)	(13%)	(1,170)	(18%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

3. Bicycle ownership was highest closest to campus. Of the students living on-campus, 40% had bicycles, as did 35% of the students who lived within one mile of campus, and 38% who lived 1 to 2 miles.

4. About the same percentage of students owned automobiles in 1971-72 (60%) as had two years earlier (58% in 1969-70).

5. Bicycle ownership increased substantially during the two years, 1969-70 to 1971-72 from 16% to 28%. This is further described in Table 62.

6. Survey data collected on vehicle ownership patterns of students of different academic standings, marital status, and sex reveals some students were more likely to own cars than others and some were more likely to own bicycles.

For example, Tables 62 and 63 show that lower-division students were more likely to own bicycles than upper-division students, who were in turn more likely to own bicycles than graduate students. By contrast, graduate students were more likely to own cars than upper-division students and upper-division students were more likely to own cars than lower-division students. Among lower-division students, 35% owned bicycles and 36% owned cars; among upper-division students, 27% owned bicycles and 58% owned cars; and among graduate students, 25% owned bicycles and 79% owned cars.

7. It appears that married students were more likely to own cars than single students but both married and single students were equally likely to own bicycles, and both were more likely to own cars than bicycles.

Table 63 shows that 76% of married students and 49% of single students owned cars, while 30% of married students and 29% of single students owned bicycles. Because a married couple frequently share one car per two persons, per capita car ownership was probably not much higher for married students than single students.

TABLE 63

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY CLASS STANDING, BY MARITAL STATUS AND BY SEX

San Diego Campus

1971-72

VEHICLE	CLASS STANDING			MARITAL STATUS		SEX		ALL STUDENTS
	L. D.	U. D.	Grad.	Single	Married	Male	Female	
Number of Students	2,470	2,347	1,358	5,071	1,104	4,014	2,161	6,175
Car	36%	58%	79%	49%	76%	60%	40%	60%
Motor Scooter or Cycle	2	4	7	3	7	5	1	3
Bicycle	34	27	25	29	30	28	33	28
None	41	30	17	34	21	28	39	27
TOTAL	113%	119%	128%	115%	134%	121%	113%	118%
(Keep Both Car and Bicycle)	(13%)	(19%)	(28%)	(15%)	(34%)	(21%)	(13%)	(18%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

TABLE 64

PROBABILITY OF VEHICLE OWNERS USING THEIR VEHICLES FOR TRANSPORTATION TO CAMPUS

San Diego Campus

1971-72

	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	Total/ Average
Number of Students	2,161	494	371	679	1,297	864	309	6,175
Percent who own cars	37%	51%	71%	67%	77%	81%	80%	60%
Percent who drive cars	25%	32%	45%	63%	73%	78%	80%	51%
Probability of car owners driving to campus	0.68	0.63	0.63	0.94	0.95	0.96	1.00	0.85
Percent who own bicycles	40%	35%	38%	29%	18%	12%	4%	28%
Percent who ride bicycles	8%	7%	21%	8%	3%	1%	0%	6%
Probability of bicycle owners riding to campus	0.20	0.20	0.55	0.28	0.17	0.08	0.00	0.21

[a] Estimated based on other campuses. Includes some students who drive cars owned by their families.

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

8. At San Diego, like other campuses, more men than women owned cars but more women than men owned bicycles. Table 63 shows that 60% of men owned cars and 28% owned bicycles; 40% of women owned cars and 33% owned bicycles.

F. VEHICLE USE

1. One of the characteristics of the heavily car-oriented campus is that there is a high probability that a student will use the car he owns for transportation to campus and a low probability that he will use the bicycle he owns for transportation to campus.

As shown in Table 63, there was an 85% probability that every student who owned a car would use it as transportation to campus, but a probability of 0.21 (21%) that students who owned bicycles would ride them to campus.

Among car drivers, there was slightly more than a 60% probability that students owning cars and living within two miles of campus would drive to campus; however, among students living three or more miles from campus the probability was 95% or better that if the student owned a car, it would be driven to campus daily.

With bicycle owners, the highest probability of use was among students living 1 to 2 miles from campus. Of these bicycle owners, 55% of them would ride to campus.

XIII. SAN FRANCISCO

A. SUMMARY

San Francisco has been classified as a pedestrian-oriented campus because approximately half of the students walk to campus from their residences. One of the major contributing factors has been the close proximity of a large amount of student-oriented housing. Over three-fifths of the San Francisco student body lives within one mile of the campus, and the great majority of those students walk. Beyond one mile, however, there is a sharp decline in the percentage of students walking; a student who lives between one and two miles away from campus is only one-sixth as likely to walk as a classmate living within one mile.

Because the number of students walking to campus has remained relatively stable in recent years, while enrollment has increased, it seems that the environs' housing for students may have reached a saturation level, and further increases in enrollment will force students to seek housing farther away. This could lead to an increased use of forms of transportation other than walking.

One likely alternative is for students to turn to public transportation. While it is still not a major travel mode at San Francisco, public transit had already doubled in popularity between 1966-67 and 1971-72, even before the energy crisis, so that one out of eight students used it in 1971-72.

Driving is the form of transportation used by about a quarter of the San Francisco students, but its popularity has been declining. The reasons for the decline include a strict campus parking policy, combined with competition from employees and visitors for the spaces that are available.

Because the campus is almost entirely medical, the congestion on campus is primarily due to non-students; for example, visitors outnumber the students by thirty percent. These factors, added to the traffic congestion in the environs which makes off-campus parking nearly impossible even for local residents, and the fact that classes are located close together so that driving around the campus is unnecessary, make driving a much less practical and therefore less popular way to get to campus.

In 1971-72, San Francisco students, on a percentage basis, owned more cars than students at Berkeley, the other pedestrian-oriented campus, because San Francisco is primarily a graduate and professional-level campus, and car ownership is higher among graduate or married students than undergraduate, single students. However, at the same time, San Francisco showed the same low probability as Berkeley, about 39%, that those cars would be used to drive to campus.

San Francisco students owned fewer bicycles but bicycle ownership increased noticeably. However, use of bicycles did not increase; there was only a 6% probability that students would use their bikes for transportation to campus, probably due to the steepness and congestion of the surrounding area. The increased ownership rates can more readily be explained by the growing popularity of bicycles for recreational purposes, and the close proximity of Golden Gate Park, a popular biking area.

At campuses where transportation to campus is not a primary reason for owning a bicycle, all classes of students are equally likely to own a bicycle, whether the students are married, male graduate students, or single female freshmen. San Francisco follows this bicycle (recreation-oriented) pattern in contrast to patterns of automobile ownership which shows variances of 20 to 30 percent in ownership rates between women and men, lower-division a[illegible]uate, or married and single students.

B. BACKGROUND

The San Francisco campus, as shown in the aerial photograph and Maps 20 and 21, on the next page, covers 108 acres. Golden Gate Park and its Panhandle from the northern edge of the environs of the campus, while Clarendon Avenue on top of Mt. Sutro forms the southern limit. Buena Vista Park and St. Joseph's Hospital, and Tenth Avenue, are defined as the eastern and western boundaries, respectively.

Campus-related facilities and activities are concentrated near the southeast corner of Golden Gate Park; the eastern portion of the environs includes the Haignt-Ashbury neighborhood. The immediate campus vicinity is primarily a high-density residential area. Ten hospitals and medical facilities are also within a radius of two-and-a-half miles from the campus. As shown in Map 21, the campus is located in the center of the City of San Francisco.

Among the transportation problems of the campus environs is the inadequacy of access, circulation, and parking facilities. Terrain, the built-up nature of the surroundings, a complex street pattern, and the large number of employees and visitors have contributed to this problem. The lack of student and low-income rental housing close to the campus and the shortage, high cost, and ownership patterns of land also indirectly contribute to transportation problems.

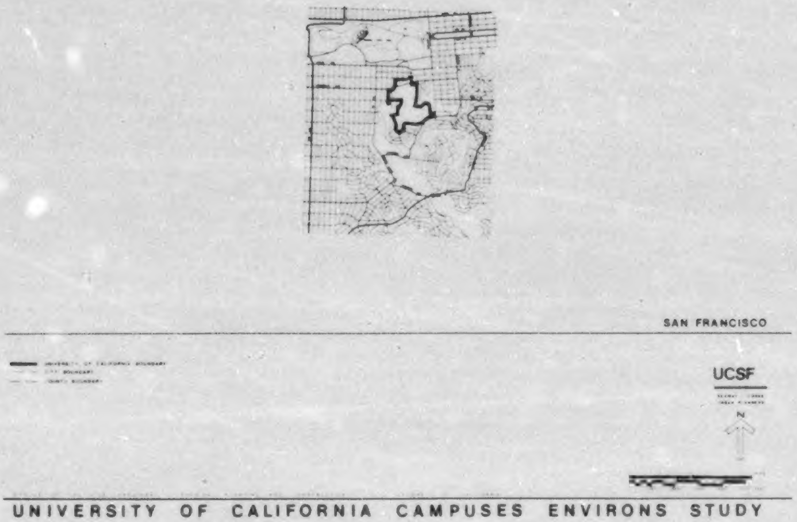
PHOTOGRAPH 14

SAN FRANCISCO CAMPUS, AERIAL VIEW, 1973

View looking east.

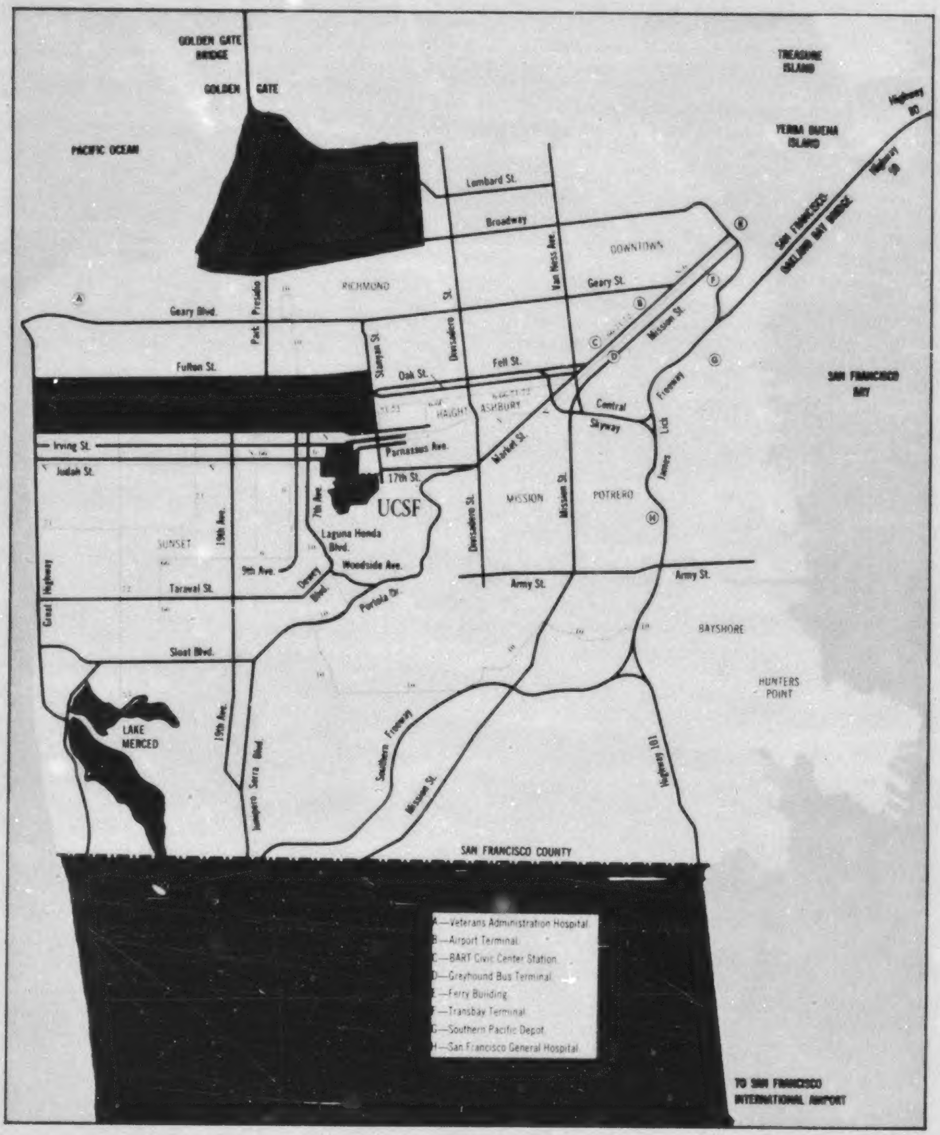
MAP 20

SAN FRANCISCO CAMPUS ENVIRONS


SAN FRANCISCO
UCSF
N
UNIVERSITY OF CALIFORNIA CAMPUSES ENVIRONS STUDY

MAP 21

SAN FRANCISCO CAMPUS REGION WIDE


GOLDEN GATE BRIDGE
GOLDEN GATE
PACIFIC OCEAN
TREASURE ISLAND
YERBA BUENA ISLAND
Highway 80
Highway 80
SAN FRANCISCO-OAKLAND BAY BRIDGE
Lombard St.
Broadway
DOWNTOWN
Van Ness Ave.
Geary St.
RICHMOND
Divisadero St.
Geary Blvd.
Park Presidio
Mission St.
Fulton St.
Stanyan St.
Oak St.
Fell St.
HAIGHT ASHBURY
Central Skyway
Freeway
SAN FRANCISCO BAY
Irving St.
Parnassus Ave.
Judah St.
17th St.
Market St.
James Lick
UCSF
7th Ave.
19th Ave.
SUNSET
Laguna Honda Blvd.
Woodside Ave.
MISSION
POTRERO
Divisadero St.
Mission St.
Great Highway
9th Ave.
Dewey Blvd.
Army St.
Army St.
Taraval St.
Portola Dr.
BAYSHORE
Sloat Blvd.
HUNTERS POINT
LAKE MERCED
19th Ave.
Junipero Serra Blvd.
Southern Freeway
Mission St.
Highway 101
SAN FRANCISCO COUNTY
A—Veterans Administration Hospital
B—Airport Terminal
C—BART Civic Center Station
D—Greyhound Bus Terminal
E—Ferry Building
F—Transbay Terminal
G—Southern Pacific Depot
H—San Francisco General Hospital
TO SAN FRANCISCO INTERNATIONAL AIRPORT

Zoning within the San Francisco campus environs is almost entirely residential, with relatively small commercial zones and no industrial zone. The lowest-density zones (maximum: 17 dwelling units/net acre; single-family residential only) adjoin the campus on the south and east. The highest are mainly along the south and east sides of the Park and on the south side of the Panhandle (maximum: 350 dwelling units/net acre; single- to multi-family, including group dwellings).

The two commercial zones--one along Haight Street from the park, the other along Irving Street from Seventh Avenue--permit retailing and personal services, professional and business services, certain commercial and auto-related uses, medical services, and hotels and motels. Planned Unit Development and medical facilities for drug or liquor addicts are conditionally permitted. On the southern boundary, there is a large "public" use zone forming part of the Lagunda Honda Hospital.

C. TRANSPORTATION ORIENTATION

The San Francisco campus, like the Berkeley campus, has been classified in this report as pedestrian-oriented because more than one-half of its student walk to campus. However, pedestrian traffic generated at the San Francisco campus must be viewed in a different context than at Berkeley. Because San Francisco is entirely a medical center campus, a major source of traffic is not students, but employees and visitors. A recent survey has indicated that even visitors outnumber students by over 30%.[1]

Both the campus and its environs encourage pedestrian movement in several ways:

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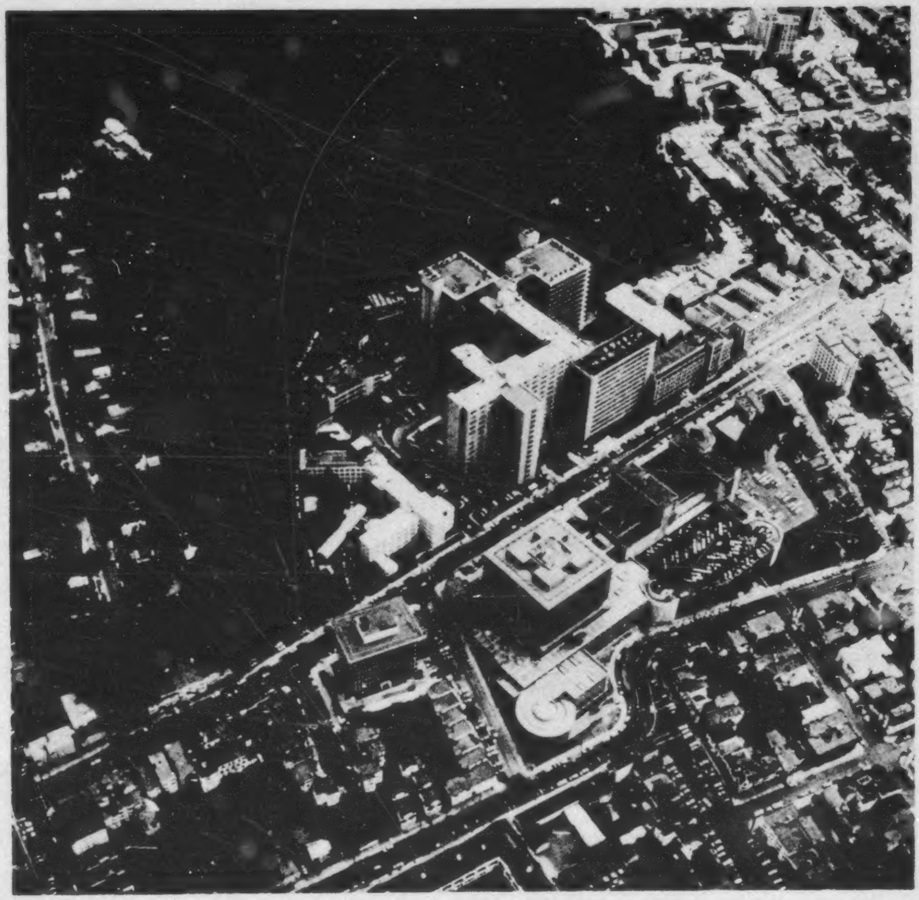
[1] Unpublished data from UCSF Visitor/Patient Survey, University of California, Office of the President, February 1974.

PHOTOGRAPH 15

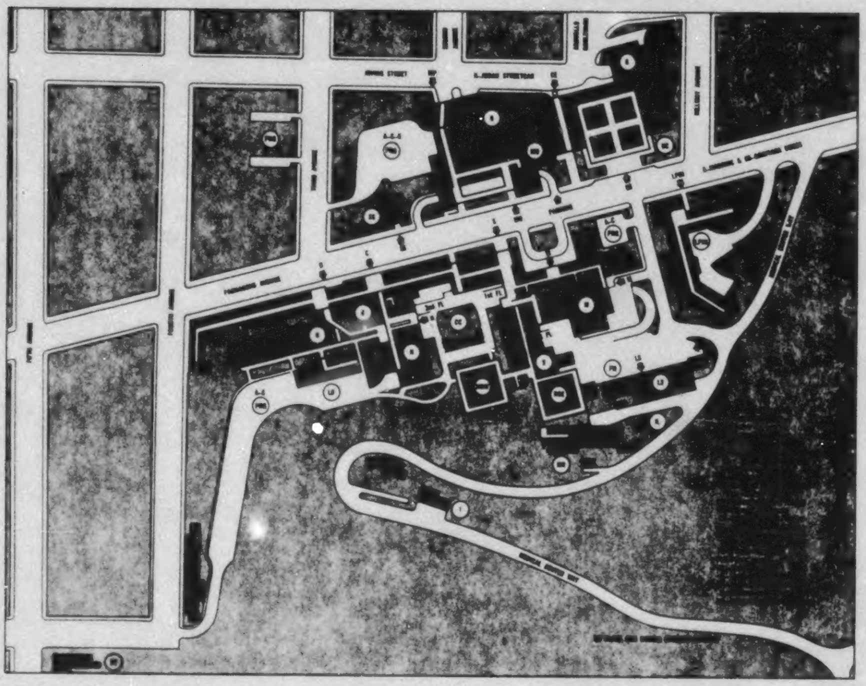
SAN FRANCISCO CAMPUS, MAIN CAMPUS AREA



Overhead view looking south. Parnassus Avenue in the northeast to southwest corridor. Photograph by Gabriel Moulin Studios.

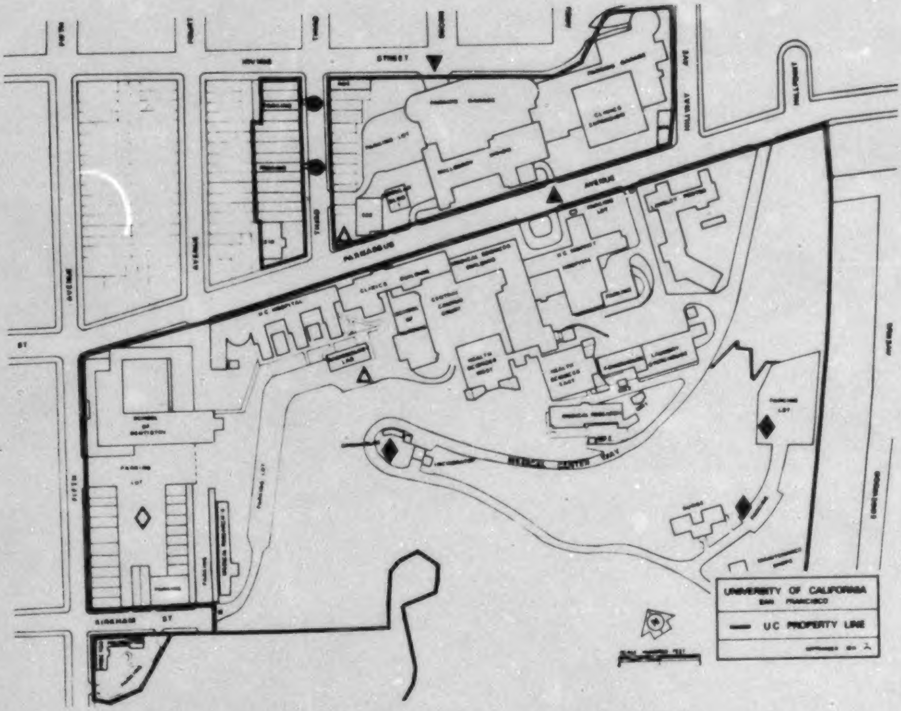
MAP 22

SAN FRANCISCO CAMPUS


2nd FL
1st FL

MAP 23

SAN FRANCISCO CAMPUS PARKING


STREET
THIRD
AVE
HILLWAY
AVENUE
PARNASSUS
U C HOSPITAL
CLINICS
HEALTH SCIENCES WEST
HEALTH SCIENCES EAST
SCHOOL OF DENTISTRY
PARKING LOT
PARKING LOT
MEDICAL CENTER WAY
ST
FIFTH
AVENUE
ST
UNIVERSITY OF CALIFORNIA
SAN FRANCISCO
U C PROPERTY LINE

A GUIDE TO PARKING AT THE SAN FRANCISCO CAMPUS

◇ Fee Parking Lot

▼ Entrance to Decal Garage

△ Two-wheel vehicle parking: *Motorcycles*—Third/Parnassus
Bicycles—behind School of Nursing

▲ Entrance to Public Parking Garage

◆ Parking areas restricted to "B" Parking Decal Holders

● Parking areas restricted to "M" Parking Decal Holders

Other areas are for "A", "C" and "G" Decals.

First, the area surrounding the campus provides a supply of housing units available to students. Consequently, a large number of San Francisco's students live within easy walking distance of campus--63% of students within one mile of campus.

Second, the campus environs offer attractive recreation and some employment within easy walking distance of both on-campus residences as well as off-campus housing.

Third, as shown in the following aerial photo, the "high-rise" development of the campus means that students walk from class to class and from building to building.

Finally, as shown in Map 23, campus policy on distribution of parking permits prevents most students from parking on-campus and combines with the considerable traffic and parking congestion in the campus environs to discourage students from driving to campus.

D. TRANSPORTATION MODES

1. The mean (average) distance of all students' residences from campus was 3.66, while the modal distance was within one mile. As shown in Tables 65 and 66, in 1971-72, 1,667 students (63% of the enrollment of 2,647) lived on-campus or within one mile of campus; 238 (9%) lived within 1 to 2 miles; 265 (10%) within 3 to 5 miles; and 477 (18%) lived six or more miles from campus.

2. Walking is the preferred mode of transportation among the students on the San Francisco campus. As illustrated in Tables 65, 55, and 67, in 1971-72, about one-half of the San Francisco students walked to campus; one-fourth used automobiles, one-eighth used public transportation and one-eighth used other modes of transportation.

TABLE 65

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS
BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

San Francisco Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	556	1,111	238	265	106	[illegible]2	159	2,647	3.66
Car Driver	50	89	98	154	63	138	110	702	8.40
Car Passenger	22	22	19	16	8	15	8	110	5.28
Car Pool	17	11	5	5	8	15	11	72	8.04
Motor Scooter or Cycle	11	0	19	16	4	2	0	52	3.00
Bicycle	0	22	10	3	0	0	0	35	1.09
Public Transportation	61	45	52	71	23	40	30	322	5.79
Walk	395	922	33	0	0	0	0	1,350	.41
Hitchhike	0	0	2	0	0	2	0	4	8.50
TOTAL	556	1,111	238	265	106	212	159	2,647	3.66

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 66

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

San Francisco Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	556	1,111	238	265	106	212	159	2,647	3.66
Car Driver	[illegible]%	8%	41%	58%	59%	65%	69%	27%	8.40
Car Passenger	4	2	8	6	8	7	5	4	5.28
Car Pool	3	1	2	2	8	7	7	3	8.04
Motor Scooter or Cycle	2	0	8	6	4	1	0	2	3.00
Bicycle	0	2	4	1	0	0	0	1	1.09
Public Transportation	11	4	22	27	21	19	19	12	5.79
Walk	71	83	14	0	0	0	0	51	0.41
Hitchhike	0	0	1	0	0	1	0	0	8.50
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	3.66 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

3. Over the six-year period, 1965-66 to 1971-72, student travel patterns at San Francisco remained fairly stable with three major exceptions. As illustrated in Table 67, first the percentage of students using public transportation doubled from 6% to 12%; second, the percentage of students driving to campus dropped from 31% to 27%; finally, the percentage of students walking declined from 55% to 51%.

4. The growth in the precentage of students using public transportation, combined with an increase in enrollment from 2,186 to 2,647 has meant that the number of students traveling to campus by public transit increased from 131 in 1965-66 to 322 in 1971-72.

5. Enrollment growth also meant an increase in the number of students walking--from 1,202 to 1,350--despite a decline in the percentage of students walking to campus.

6. The number of students using other travel modes stayed approximately the same in the six years surveyed. As illustrated in Table 67, the number of students driving to campus remained constant at about 700, while bicycle use was negligible.

7. One of the most interesting aspects of travel patterns of San Francisco students is that although a very high percentage of students walked to campus, it was only because a very high percentage of students lived on campus or within one mile of campus and walking was very popular among these students. As illustrated in Tables 65 and 66, for every 100 students living within one mile of campus, only eight students drove to campus, while 83 walked. (By comparison, at Berkeley, within one mile of campus, 4 out of 100 drove, and 72 out of 100 walked.)

TABLE 67

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS

San Francisco Campus

1965-66, 1967-68, 1969-70, and 1971-72

TRANSPORTATION MODE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students	2,186	100%	2,295	100%	2,484	100%	2,647	100%
Car Driver	677	31%	505	22%	670	27%	702	27%
Car Passenger	66	3	69	3	75	3	110	4
Car Pool	66	3	46	2	75	3	72	3
Motor Scooter or Cycle	44	2	69	3	50	2	52	2
Bicycle	0	0	0	0	0	0	35	1
Public Transportation	131	6	252	11	248	10	322	12
Walk	1,202	55	1,354	59	1,366	55	1,350	51
Hitchhike	--	NA	--	NA	--	NA	4	--
TOTAL	2,186	100%	2,295	100%	2,484	100%	2,647	100%

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

8. Walking was not as popular among students living more than one mile from campus--only 14% of students living from 1 to 2 miles from campus walked, while 41% drove and 22% used public transit. This suggests that any decline in the number of students living within one mile of campus and an increase in the number living beyond one mile will mean a shift of transportation modes from walking to driving, and perhaps to public transit. In the four years, from 1967-68 to 1971-72, this in fact happened.

9. As the percentage of students living within one mile of campus decreased from 74% in 1967-68 to 63% in 1971-72, the overall percentage of students walking to campus decreased from 59% to 51%. At the same time the overall percentage of students driving to campus increased from 22% to 27% and the percentage of students using public transit remained constant at 11% to 12%.

It is worthwhile to note that during the period, 1967-68 to 1971-72, the number of students walking to campus remained stable at about 1,350, while enrollment increased by 358 students (from 2,295 to 2,647). This constant student pedestrian population may mean that the student housing in the San Francisco campus environs has reached a saturation level.

It also may mean that unless efforts are made to increase the likelihood of students using other travel modes--particularly public transportation--any increase in the number of students enrolled or any increase in the proportion of students living more than one mile from campus will likely result in an increase in the number of students driving cars to campus rather than an increase in the number of students walking.

E. VEHICLE OWNERSHIP

1. Although pedestrian transportation patterns are similar at the San Francisco and Berkeley campuses, vehicle ownership patterns differ between the two campuses. A higher percentage of students owned cars (69%) and a lower percentage of students owned bicycles (16%) at San Francisco than at Berkeley (53% and 32% respectively). This was because first, there was a higher percentage of graduate and married students at San Francisco and, second, the steepness of the environs and the congestion of the streets simply discourage bicycling.

2. Bicycle ownership was slightly more popular among students living one to two miles from campus than among students living farther away from campus. As illustrated in Tables 68 and 69, one-fifth of students living within one to two miles of campus owned bicycles, while one-eighth who lived three or more miles owned bicycles.

3. Automobile ownership was substantial regardless of how far students lived from campus. In 1971-72, 72% of students living within on mile of campus and between 70% and 80% of all students living beyond two miles, owned cars; this high car ownership rate was related to the high marriage rates among the graduate and professional students at San Francisco[2] and the students' needs for cars to get to a variety of urban activities in the City of San Francisco and in the Bay Area Region.

4. At both Berkeley and San Francisco, however, bicycle ownership is becoming more common. As shown in Table 70, in 1969-70, 6% of San Francisco's students owned bicycles; in 1971-72, 16% owned bicycles.

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[2] The San Francisco campus marriage rate of 37% in 1971-72, was nearly double that of the University-wide average of 20.2%. See, Married Students: A Study of Decreasing Marriage Rates and Family Sizes at the University of California, Ira Stephen Fink and Joan Cooke, op. cit., p. 20.

TABLE 68

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

San Francisco Campus

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	556	1,111	238	265	106	212	159	2,647	3.66
Car	300	800	184	188	74	159	118	1,823	3.96
Motor Scooter or Cycle	0	11	7	5	1	0	0	24	1.88
Bicycle	50	211	52	34	15	28	21	411	3.31
None	239	267	45	72	30	53	41	747	3.39
TOTAL	589	1,289	288	299	120	240	180	3,005	
(Keep Both Car and Bicycle)	33	178	50	34	14	28	21	358	3.71

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 69

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

San Francisco Campus

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	556	1,111	238	265	106	212	159	2,647	3.66
Car	54%	72%	77%	71%	70%	75%	74%	69%	3.96
Motor Scooter or Cycle	0	1	3	2	1	0	0	1	1.88
Bicycle	9	19	22	13	14	13	13	16	3.31
None	43	24	19	27	28	25	26	28	3.39
TOTAL	106%	116%	121%	113%	113%	113%	113%	114%	
(Keep Both Car and Bicycle)	(6%)	(16%)	(21%)	(13%)	(13%)	(13%)	(13%)	(14%)	3.71 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 70

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE

San Francisco Campus

1965-66, 1967-68, 1969-70, and 1971-72

VEHICLE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students			2,295	100%	2,484	100%	2,647	100%
Car			1,492	65%	1,739	70%	1,823	69%
Motor Scooter or Cycle	Not Available		23	1	99	4	24	1
Bicycle			207	9	149	6	411	16
None			757	33	721	29	747	28
TOTAL			2,479	108%	2,708	109%	3,005	114%
(Keep Both Car and Bicycle			(184)	(8%)	(224)	(9%)	(358)	(14%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

5. In contrast to growth in bicycle ownership, the percentage of students owning cars remained about the same at about two-thirds of the student population. In 1967-68, an average of 65% of the students owned cars; in 1971-72, 69% of students owned cars.

6. The percentage of San Francisco students owning bicycles (about 16%) was generally the same regardless of a student's class standing, marital status, or sex.

7. The percentage of students owning automobiles varied considerably among undergraduate and graduate students, married and single students, and men and women. Table 71 indicates, for example, 13% of undergraduates and 17% of graduate students owned bicycles, while 48% of undergraduates and 73% of graduates owned cars; similarly, 15% of single students and 17% of married students owned bicycles, while 61% and 82% respectively owned cars; and, finally, 18% of men and 13% of women owned bicycles, while 81% of men and 51% of women owned cars.

F. VEHICLE USE

1. Although bicycle ownership at the San Francisco campus has been gradually becoming more popular, the use of bicycles as a mode of transportation to campus has not. This suggests that the recent growth in bicycle ownership at San Francisco has had less to do with the use of bicycles as a mode of transportation and has been more related to the use of bicycles for recreational purposes. Because Golden Gate Park, a major city recreation area suited for bicycling, is located within the campus neighborhood, it seems quite likely that students living in the vicinity of the campus use their bicycles for recreation.

TABLE 71

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY CLASS STANDING, BY MARITAL STATUS AND BY SEX

San Francisco Campus

1971-72

VEHICLE	CLASS STANDING			MARITAL STATUS		SEX		ALL STUDENTS
	L. D.	U. D.	Grad.	Single	Married	Male	Female	
Number of Students	0	371	2,276	1,667	980	1,747	900	2,647
Car	0	48%	73%	61%	82%	81%	51%	69%
Motor Scooter or Cycle	0	0	1	1	1	1	0	1
Bicycle	0	13	17	15	17	18	13	16
None	0	48	24	35	17	16	46	28
TOTAL	0	109%	115%	112%	117%	116%	110%	114%
(Keep Both Car and Bicycle)	0	(9%)	(15%)	(12%)	(17%)	(16%)	(10%)	(14%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

TABLE 72

PROBABILITY OF VEHICLE OWNERS USING THEIR VEHICLES FOR TRANSPORTATION TO CAMPUS

San Francisco Campus

1971-72

	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	Total/ Average
Number of Students	556	1,111	238	265	106	212	159	2,647
Percent who own cars	54%	72%	77%	71%	70%	75%	74%	69%
Percent who drive cars	9%	8%	41%	58%	59%	65%	69%	27%
Probability of car owners driving to campus	0.17	0.11	0.53	0.82	0.84	0.87	0.93	0.39
Percent who own bicycles	9%	19%	22%	13%	14%	13%	13%	16%
Percent who ride bicycles	0%	2%	4%	1%	0%	0%	0%	1%
Probability of bicycle owners riding to campus	0.00	0.11	0.18	0.08	0.00	0.00	0.00	0.06

[a] Estimated based on other campuses. Includes some students who drive cars owned by their families.

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

2. While in 1971-72, a higher percentage of students owned cars at the San Francisco campus (69%) than at the Berkeley campus (53%), the probability of students actually using the cars they own as transportation to campus was similar. At both campuses there was probability that only 0.39 of the students who own cars would use them as transportation to campus--while 69% of all students at San Francisco owned cars, only 27% used them to drive to campus.

The data in Table 72 substantiates the observation that the travel style of the campus--in this case a pedestrian one--is a greater factor in determining the number of students driving cars to campus than simply the number of students owning cars.

3. Among San Francisco students, 16% owned bicycles, yet only one percent used them--a use probability of 0.06. The low bicycle use is the result of vehicle congestion, the steep topography of the campus and its environs, and the lack of security for unattended bicycles.

XIV. SANTA BARBARA

A. SUMMARY

Santa Barbara has been classified as a bicycle-oriented campus because in 1971-72 over one-half of its students used bicycles to reach the campus from their residences. A number of factors contributed to this orientation, including the close proximity of available housing--80% of the students lived within two miles of the campus, many of them in Isla Vista which is within easy bicycling distance. The dispersion of campus buildings also makes bicycling a convenient way to get from class to class, and the environs are only moderately urbanized.

In addition, campus policies have actively discouraged the use of automobiles and encouraged the use of bicycles. Parking permits are no longer issued to students living within one mile of campus; letters have been sent to incoming students asking them not to bring their cars with them to Santa Barbara; and kiosks have been built at the two vehicular entrances to discourage through-traffic across the campus and to make non-permit parking illegal.

To encourage bicycling the campus has developed a system of bike paths linking the campus with Isla Vista, as well as constructing four vehicular grade separations to keep bicyclists safely away from motor vehicles. Bike racks have also been made available around the campus.

These measures apparently have had a significant effect; there has been a marked drop in the number of cars being driven to campus, and the percentage of students keeping cars at their campus residences has risen much more slowly at Santa Barbara than at other campuses. A further illustration of the importance of campus action was the startling increase in the use of bicycles over the six-year survey period. Although in 1971-72, Santa Barbara had a slightly lower percentage of students who rode bicycles than did the Davis campus (58% at Santa Barbara as compared to 64% at Davis), in 1965-66 Davis had already had 54% riding bikes, while Santa Barbara had had only 26%. Thus, while the percentage at Santa Barbara more than doubled, the number of bike riders at Santa Barbara actually tripled as a result of enrollment increases.

Bicycle use gained in popularity at the expense of every other form of transportation; the combined decreases in the percentages of students using cars, public transportation and walking was almost exactly equal to the increase in the percentage using bicycles.

More students at Santa Barbara owned bicycles than cars in 1971-72; the opposite had been true only two years earlier. The ownership rate decreased proportionately with distance from the campus; however, eight out of ten students living within two miles kept bicycles, decreasing to five out of ten students living between three and five miles, and to less than three out of ten living beyond six miles. Car ownership rose to a peak among students living 3 to 5 miles from campus and then tapered off.

As a student's class standing increased from lower-division to upper-division to graduate, he or she was more likely to own a car and less likely to own a bicycle. Similarly, married students and men owned more cars and fewer bicycles than single students and women. A third of the students kept both a car and a bicycle and, as with Davis, due to the high number of bicycles, only a small percentage kept no vehicle at all; in this case it was only one-tenth of the students.

Students at Santa Barbara were also much more likely to bring the bicycles they owned to campus (an 80% probability) than the cars they owned (only a 30% probability); within two miles bicycle owners were 90% likely to ride them to campus. However, for students living between three and five miles, there was a sharp drop in the probability of riding a bicycle, and cars became much more popular.

B. BACKGROUND

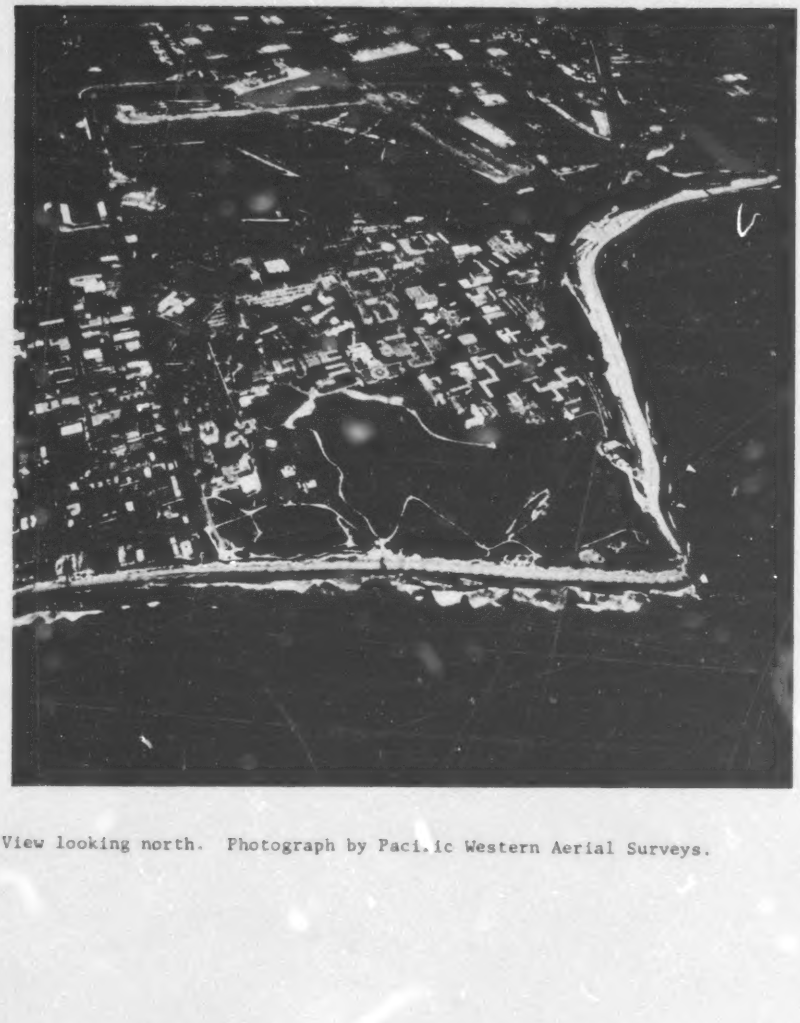
The 808-acre Santa Barbara campus and the residential sections of its environs are in an unincorporated area of the South Coast Region of Santa Barbara County, while the Santa Barbara municipal airport, which has coterminous boundaries with the campus, is part of the City of Santa Barbara. As shown in the aerial photograph and Map 24, the main off-campus residential area for students, Isla Vista, adjoins the main (east) campus on the west and is surrounded on three sides by University property. Though mostly unincorporated, the campus environs and its vicinity have been the recent growth center of Santa Barbara County.

The campus and Isla Vista are somewhat remote from the urban employment, commercial, and entertainment center of Santa Barbara and public transportation is inadequate. The City of Santa Barbara is 10 miles east of the campus.

Automobile traffic problems are compounded first by the Isla Vista street system--the streets are narrow and poorly laid out--and second, by the fact that the main campus has only two vehicular entrances, both with "bottleneck" sections. A proposed extension of the Clarence Ward Memorial Freeway through the campus was abandoned in 1969 due to controversy over conservation of the slough which it would have crossed.

PHOTOGRAPH 16

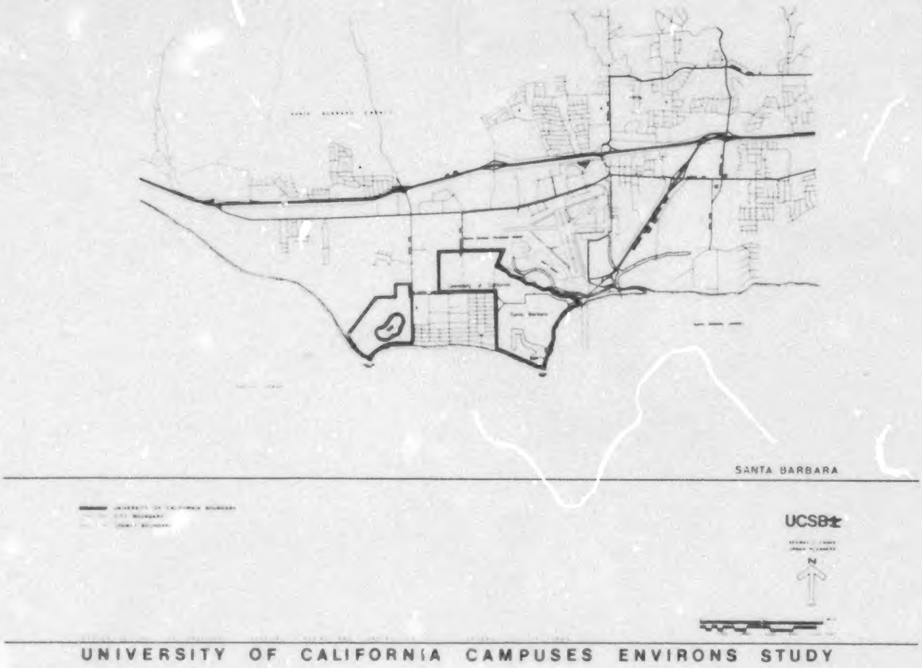
SANTA BARBARA CAMPUS, AERIAL VIEW, 1974



View looking north. Photograph by Pacific Western Aerial Surveys.

MAP 24

SANTA BARBARA CAMPUS ENVIRONS



SANTA BARBARA
UNIVERSITY OF CALIFORNIA BOUNDARY
CITY BOUNDARY
COUNTY BOUNDARY
UCSB
N
UNIVERSITY OF CALIFORNIA CAMPUSES ENVIRONS STUDY

Santa Barbara County zoning for the environs is residential and industrial-residential in the western and eastern sections, respectively, and industrial in the north and northeast. Single- to multi-family residential zones permit an overall range of densities from 4.3 dwelling unit/net acre to 50 dwelling unit/net acre. The lowest are the southeast section east of the airport (maximum: below 5 du/net acre; single-family only). In the west section, maximum densities are somewhat higher (below 10 du/net acre) and multi- as well as single-family dwelling types are permitted. The highest-density (up to 50 du/net acre) zone is in a small area north of Isla Vista, on the north side of El Colegio Road. However, all dwellings are only conditionally permitted.

Commercial zoning in the environs is in three locations west of the campus--in Isla Vista, and on the east and west sides of Storke Road south of Hollister Avenue. Commercial uses from retailing to hotels and motels are permitted. In all industrial zones, light industrial and industrial research uses are permitted.

C. TRANSPORTATION ORIENTATION

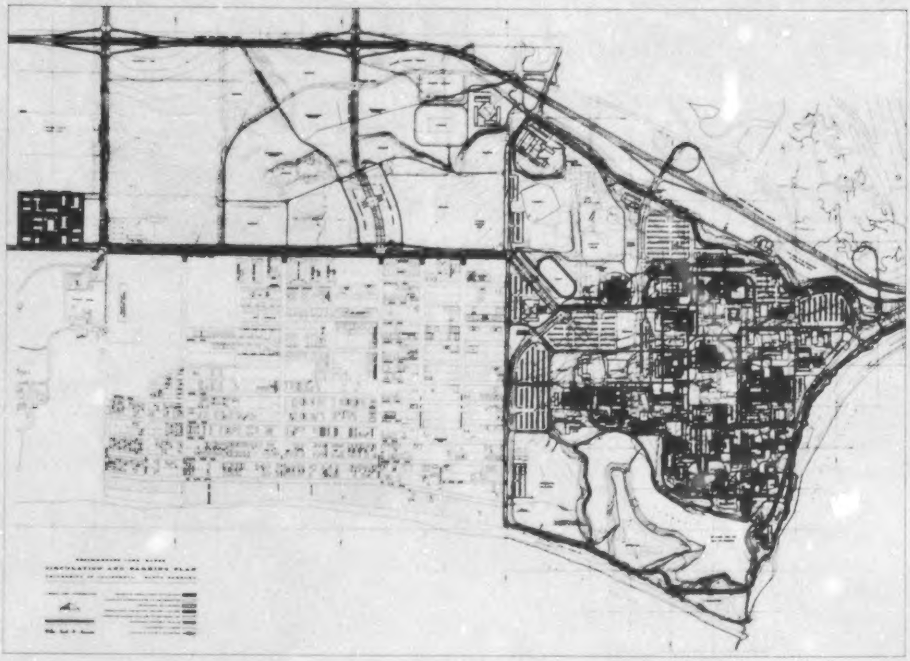
At Santa Barbara, as at Davis, the substantial growth in the popularity of bicycling was in part a consequence of environmental conditions and in part a result of deliberate efforts by campus planners to encourage bicycling. As the campus grew in enrollment, from 9,478 in 1965-66 to 12,239 in 1971-72 use of bicycles increased from 2,438 students (26%) to 7,072 (58%).

A comprehensive traffic and transportation survey for the Santa Barbara campus completed by Wilbur Smith and Associates in 1966 observed:

MAP 25

SANTA BARBARA CAMPUS (WILBUR SMITH)

BIKEWAY PROPOSAL



> "The Santa Barbara campus is ideally suited to cycling. About 80% of the total student population (when the campus reaches its peak enrollment of 20,000) will reside within easy bicycling distance of the academic campus. The campus is relatively level, encouraging use of bicycles....Future use of bicycles is almost certain to increase at a rate greater than student enrollment."[1]

The conditions which have encouraged students to use bicycles at Santa Barbara are generally similar to conditions which have encouraged students to bicycle to campus at Davis. The site of the campus, isolated from the higher density urban development of the City of Santa Barbara--South Coast Region, but adjacent to the student-oriented housing community of Isla Vista, as well as the flat terrain of the entire area, provides a congenial setting for the bicycling orientation of the campus, as shown in Map 25.

Specifically, five conditions have helped stimulate the bicycle orientation. First, a high proportion of students, 80%, live within bicycling distance (two miles) of campus; second, as shown in Map 26, the academic buildings are sufficiently dispersed on the campus to make bicycling as preferable as walking; third, the campus environs area, aside from Isla Vista, is only moderately urbanized, thus reducing hazardous traffic congestion; fourth, the flat terrain of the campus and much of the environs makes bicycling non-strenuous; and, fifth, the recognition by campus planners that it would be wise to take advantage of the conditions noted above and encourage students to use bicycles and to leave their cars at home. A number of campus policies and programs have been initiated to this end.

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[1] Wilbur Smith and Associates, Circulation and Parking Study, prepared for the University of California, Santa Barbara, January 1966, p. 52.

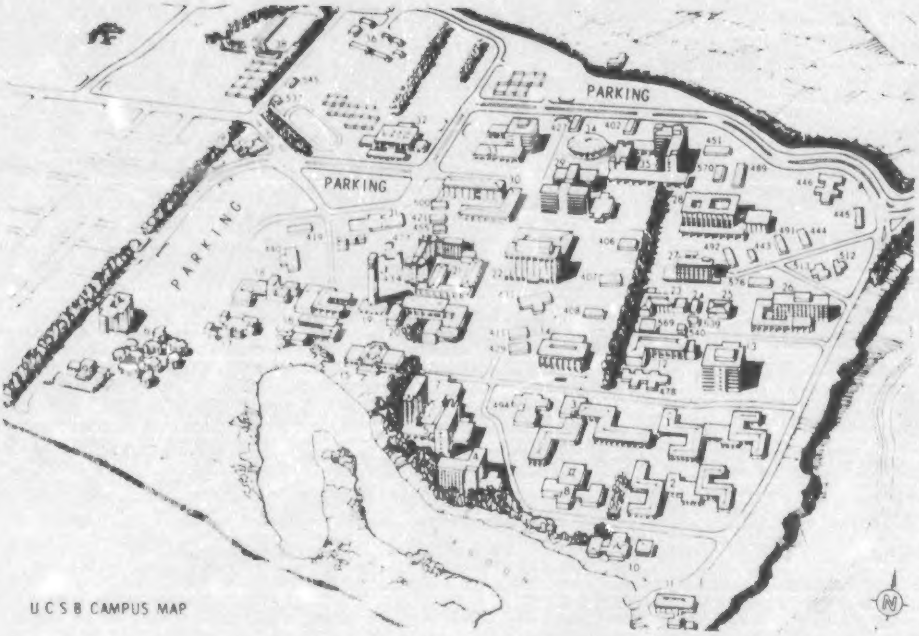
One of the first measures the campus initiated in an attempt to control the number of cars going to and from campus required that students living within one mile of campus be denied campus parking permits. Beginning in 1967-68, the campus did not issue permits to freshmen living within one mile of campus. Each successive year the campus has denied permits to the next higher academic class. Thus, by 1971-72, no undergraduates living within one mile of campus were issued campus parking permits. As a consequence of this policy, between 1966-67 when the measure was initiated and 1971-72 when it was totally in effect, driving to campus decreased from 20% to 2% of the students or from 1,375 drivers to 153 drivers.

If the policy of eliminating parking permits for students living within one mile of campus had not gone into effect, and the percentage of students living within one mile of campus and driving to campus remained the same in 1971-72 as in 1966-67, that is at 20%, then the number of students driving to campus would have increased from 1,375 in 1966-67 to 1,537 in 1971-72. Thus, the campus policy may have had the effect of keeping about 1,400 additional cars from coming to campus each day.

A second attempt to control the number of cars coming to campus was begun in Spring 1969. At that time, kiosks were set up at the two automobile entrances to the campus in order to reduce traffic through campus to Isla Vista from the City of Santa Barbara and Goleta and to control illegal parking. The kiosks had the effect of reducing the number of automobile trips per day to campus per students who drove cars from 2.0 trips in 1969 to 1.4 in 1970. The kiosks also contributed to reducing the number of students who would drive to campus and park illegally, if even for a short period of time.

MAP 26

SANTA BARBARA CAMPUS OBLIQUE SKETCH


PARKING
PARKING
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U C S B CAMPUS MAP
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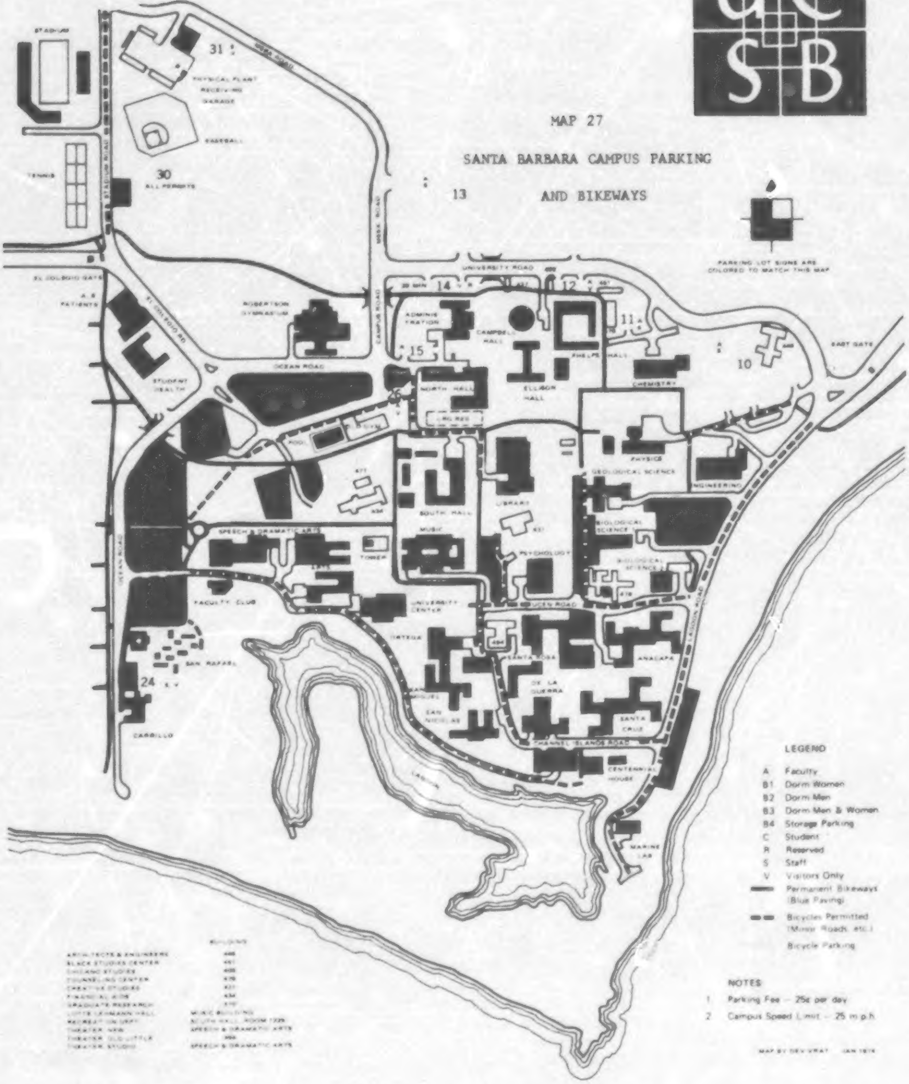

STADIUM
TENNIS
STADIUM ROAD
31
MESA ROAD
PHYSICAL PLANT
RECEIVING
GARAGE
BASEBALL
30
ALL PERMITS
13
UNIVERSITY ROAD
14
12
11
10
15
EL COLEGIO GATE
A-B
PATIENTS
EL COLEGIO RD
ROBERTSON
GYMNASIUM
CAMPUS ROAD
ADMINISTRATION
CAMPBELL HALL
PHELPS HALL
ELLISON HALL
CHEMISTRY
EAST GATE
OCEAN ROAD
STUDENT HEALTH
NORTH HALL
POOL
GYM
PHYSICS
GEOLOGICAL SCIENCE
ENGINEERING
LIBRARY
SOUTH HALL
BIOLOGICAL SCIENCE
BIOLOGICAL SCIENCE 2
MUSIC
PSYCHOLOGY
SPEECH & DRAMATIC ARTS
ARTS
TOWER
FACULTY CLUB
UNIVERSITY CENTER
UCEN ROAD
OCEAN ROAD
ORTEGA
SANTA ROSA
ANACAPA
DE LA GUERRA
SAN MIGUEL
SAN NICOLAS
SANTA CRUZ
CHANNEL ISLANDS ROAD
CENTENNIAL HOUSE
LAGOON ROAD
LAGOON
MARINE LAB
SAN RAFAEL
24
CARRILLO
PARKING LOT SIGNS ARE COLORED TO MATCH THIS MAP
BUILDING
ARCHITECTS & ENGINEERS
BLACK STUDIES CENTER
CHICANO STUDIES
COUNSELING CENTER
CREATIVE STUDIES
FINANCIAL AIDS
GRADUATE RESEARCH
LOTTE LEHMANN HALL
MUSIC BUILDING
RECREATION DEPT.
SOUTH HALL, ROOM 1329
THEATER, NEW
SPEECH & DRAMATIC ARTS
THEATER, OLD LITTLE
THEATER, STUDIO
SPEECH & DRAMATIC ARTS
MAP BY DEV VRAT JAN 1974

MAP 27

SANTA BARBARA CAMPUS PARKING

AND BIKEWAYS

LEGEND

A	Faculty
B1	Dorm Women
B2	Dorm Men
B3	Dorm Men & Women
B4	Storage Parking
C	Student
R	Reserved
S	Staff
V	Visitors Only
▬	Permanent Bikeways (Blue Paving)
▬ ▬	Bicycles Permitted (Minor Roads, etc.)
	Bicycle Parking

NOTES

1 Parking Fee – 25¢ per day
2 Campus Speed Limit – 25 m.p.h.

As a third effort to discourage students from bringing cars to campus, in 1971-72 a letter was sent to all incoming students asking them not to bring their cars to their on- or off-campus residences. Because, compared with other campuses, automobile ownership among lower-division students at Santa Barbara remained relatively constant, increasing only from 30% in 1970-71 to 31% in 1971-72, this letter appears to have had its intended effect.

In conjunction with policies to discourage students from driving cars to campus, Santa Barbara has initiated a number of programs to encourage students to ride bicycles to campus. A circulation and parking study prepared for the Santa Barbara campus by Wilbur Smith and Associates in 1966, as shown in Map 25, proposed that "in order to provide for bicycle travel and to separate the bicycle flows from vehicular and pedestrian movements, a completely separate system of bicycle paths [should] be included in the circulation plan." Also, the study proposed construction of grade separated pedestrian and bicycle underpasses at four locations to eliminate potential conflict with motor vehicle traffic.

As a result of these two proposals--the bicycle path and the grade separations--the campus developed an extensive system of paths for exclusive bicycle use and also constructed four vehicular grade separations; as shown in Maps 26 and 27, the system now links the campus with the adjacent Isla Vista community. The campus also has provided bicycle racks for bicycle storage on campus. These actions, in conjunction with increased enrollments and policies discouraging car use, have resulted in a tripling of the number of bicyclists coming to campus over a six-year period. In 1965-66, 2,438 (26%) students rode bicycles to campus; in 1971-72, 7,072 (58%) students rode bicycles to campus.

In conclusion, the substantial popularity of bicycles at the Santa Barbara campus did not develop accidentally. A number of existing conditions--flat topography, isolation of the campus from extensive urban development, ability to separate pedestrians and bicycles from automobile traffic, and ample number of student-oriented housing units within bicycling distance--were conducive to the creation of a bicycle-oriented student environment; however, positive action by the campus administration to capitalize on these assets was needed to transform the campus from one with an automobile orientation, to one where bicycles are now the dominant mode.

D. TRANSPORTATION MODES

1. The mean (average) distance of all student residences from campus is 2.57 miles, while the modal distance is within one mile.

As shown in Tables 73 and 74, in 1971-72, 7,701 students (63% of the enrollment of 12,238) lived on-campus or within one mile of campus; an additional 2,081 (17%) lived within 1 to 2 miles of campus; 734 (6%) lived within 3 to 5 miles and 1,713 (14%) lived six or more miles from campus.

2. At Santa Barbara, a majority of the students use bicycles as their preferred mode of transportation to campus.

As illustrated in Tables 73, 74, and 75, in 1971-72, approximately 6 out of 10 Santa Barbara students used bicycles; 2 out of 10 walked to campus and 2 out of 10 used automobiles (were car drivers, car passengers, or came in car pools).

TABLE 73

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Santa Barbara Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	2,448	5,263	2,081	734	734	734	245	12,239	2.57
Car Driver	0	105	270	411	506	514	164	1,970	9.02
Car Passenger	0	0	21	44	59	44	32	200	9.07
Car Pool	0	0	21	37	37	66	39	200	11.50
Motor Scooter or Cycle	0	53	42	37	29	22	2	185	4.63
Bicycle	1,665	3,842	1,352	154	37	22	0	7,072	.77
Public Transportation	0	0	42	0	29	22	0	93	6.84
Walk	783	1,263	312	29	0	0	0	2,387	.73
Hitchhike	0	0	21	22	37	44	8	132	9.68
TOTAL	2,448	5,263	2,081	734	734	734	245	12,239	2.57

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 74

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Santa Barbara Campus

1971-72

	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								
TRANSPORTATION MODE	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	2,448	5,263	2,081	734	734	734	245	12,239	2.57
Car Driver	0%	2%	13%	56%	69%	70%	67%	16%	9.02
Car Passenger	0	0	1	6	8	6	13	2	9.07
Car Pool	0	0	1	5	5	9	16	2	11.50
Motor Scooter or Cycle	0	1	2	5	4	3	1	1	4.63
Bicycle	68	73	65	21	5	3	0	58	0.77
Public Transportation	0	0	2	0	4	3	0	1	6.84
Walk	32	24	15	4	0	0	0	19	0.73
Hitchhike	0	0	1	3	5	6	3	1	9.68
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	2.57 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 75

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS

Santa Barbara Campus

1965-66, 1967-68, 1969-70, and 1971-72

TRANSPORTATION MODE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students	9,378	100%	11,776	100%	13,254	100%	12,239	100%
Car Driver	2,344	25%	2,473	21%	2,651	20%	1,985	16%
Car Passenger	844	9	353	3	265	2	192	2
Car Pool	94	1	118	1	265	2	193	2
Motor Scooter or Cycle	188	2	236	2	265	2	185	1
Bicycle	2,438	26	3,297	28	5,036	38	7,072	58
Public Transportation	375	4	118	1	133	1	93	1
Walk	3,095	33	5,181	44	4,639	35	2,387	19
Hitchhike	--	NA	--	NA	--	NA	132	1
TOTAL	9,378	100%	11,776	100%	13,254	100%	12,239	100%

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

3. While bicycles have been the dominant mode of transportation at Davis for some time--54% of students rode bicycles to the Davis campus in 1965-66--there was a considerable growth in bicycle use at Santa Barbara in just the two-year period, 1969-70 to 1971-72.

As illustrated in Table 75, in 1965-66, 26% of students bicycled to Santa Barbara campus; in 1969-70, 38% of students bicycled to campus; however, by 1971-72, 58% of students bicycled to campus. Because of the substantial growth in campus enrollment, from 9,378 in 1965-66 to 12,239 in 1971-72, the number of bicycles on campus at Santa Barbara nearly tripled during the same period, from 2,438 to 7,072.

4. As the percentage of students bicycling to campus increased over the six-year period, 1967-68 to 1971-72, a substantial decrease in the number and percentage of students who drove cars or walked to campus took place.

This meant that despite an enrollment increase of 2,841, the number of students driving to campus dropped from 3,282 in 1965-66 to 2,370 in 1971-72 and the number of students walking to campus declined from 3,095 to 2,387.

5. The decrease in car drivers, car passengers, and walkers, when coupled with the 3% decrease in the percentage of students using public transportation, adds up almot exactly to the increase in bicycle use.

In 1965-66, 35% of students drove to campus (or came as passengers in car pools), 33% walked, and 26% bicycled. By 1971-72, only 20% used cars, while 19% walked, and 58% bicycled to campus. The 29% decrease in drivers and walkers was offset by the 28% increase in bicycle riders.

TABLE 76

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Santa Barbara Campus

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	2,448	5,263	2,081	734	734	734	245	12,239	2.57
Car	588	2,684	1,269	573	551	551	164	6,380	3.50
Motor Scooter or Cycle	25	53	42	7	15	7	2	151	2.64
Bicycle	2,007	4,210	1,582	375	235	220	52	8,681	1.49
None	318	474	166	73	117	140	49	1,337	3.86
TOTAL	2,938	7,421	3,059	1,028	918	918	267	16,549	
(Keep Both Car and Bicycle)	490	2,158	978	294	184	184	22	4,310	2.01

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 77

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Santa Barbara Campus

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	2,448	5,263	2,081	734	734	734	245	12,239	2.57
Car	24%	51%	61%	78%	75%	75%	67%	52%	3.50
Motor Scooter or Cycle	1	1	2	1	2	1	1	1	2.64
Bicycle	82	80	76	51	32	30	21	71	1.49
None	13	9	8	10	16	19	20	11	3.86
TOTAL	120%	141%	147%	140%	125%	125%	109%	135%	
(Keep Both Car and Bicycle)	(20%)	(41%)	(47%)	(40%)	(25%)	(25%)	(9%)	(35%)	2.01 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

E. VEHICLE OWNERSHIP

1. Reflecting the increasing popularity of bicycles at the Santa Barbara campus, in 1971-72, more students owned bicycles (71%) than cars (52%). Only two years earlier, in 1969-70, 50% owned bicycles, while 56% owned cars. Tables 76, 77, and 79 show that more than one-third of all students (35%) owned both cars and bicycles; about one-tenth of all students (11%) did not own any vehicles and only 1% of the students owned motorcycles or motor scooters.

2. The probability that a student would keep a bicycle was directly related to the distance the student lived from campus. As shown in Table 76, bicycles were most popular among students living within two miles of campus, retained their popularity among students living 3 to 5 miles from campus, but among students living beyond six miles the popularity dropped markedly--in 1971-72, about 80% of students living within two miles of campus kept bicycles, as did 51% of students living 3 to 5 miles from campus, but beyond six miles from campus only about one-quarter of the students kept bicycles.

3. At Santa Barbara, like Davis, bicycle ownership was more popular among lower-division students than upper-division students and more popular among upper-division students than graduate students. As shown in Table 79, in 1971-72, 83% of lower-division students kept bicycles; 73% of upper-division students and 56% of graduate students kept bicycles. More single students (76%) than married students (64%) kept bicycles and more women (82%) than men (69%) kept bicycles.

TABLE 78

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE

Santa Barbara Campus

1965-66, 1967-68, 1969-70, and 1971-72

VEHICLE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students			11,776	100%	13,254	100%	12,239	100%
Car	Not Available		6,241	53%	7,422	56%	6,380	52%
Motor Scooter or Cycle			471	4	398	3	151	1
Bicycle			5,535	47	6,627	50	8,681	71
None			2,355	20	2,253	17	1,337	11
TOTAL			14,602	124%	16,700	126%	16,549	135%
(Keep Both Car and Bicycle)			(2,826)	(24%)	(3,446)	(26%)	(4,310)	(35%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

TABLE 79

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY CLASS STANDING, BY MARITAL STATUS AND BY SEX

Santa Barbara Campus

1971-72

VEHICLE	CLASS STANDING			MARITAL STATUS		SEX		ALL STUDENTS
	L. D.	U. D.	Grad.	Single	Married	Male	Female	
Number of Students	4,528	5,997	1,714	10,681	1,558	6,609	5,630	12,239
Car	31%	59%	89%	46%	69%	64%	37%	52%
Motor Scooter or Cycle	1	1	1	1	1	2	0	1
Bicycle	83	73	56	76	64	69	82	71
None	11	11	13	11	12	12	11	11
TOTAL	126%	144%	159%	134%	146%	147%	130%	135%
(Keep Both Car and Bicycle)	(26%)	(44%)	(59%)	(34%)	(46%)	(47%)	(30%)	(35%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

4. The slight increase in the percentage of students keeping cars and the large increase in the percentage keeping bicycles, has resulted in a significantly increased percentage of students keeping both cars and bicycles since 1967-68. As illustrated in Table 78, in 1967-68, 24% of Santa Barbara's students kept both cars and bicycles; in 1971-72, 35% of students kept both.

5. During the period, 1967-68 to 1971-72, and as shown in Table 78, the decrease in the percentage of students who did not own any vehicle decreased from 20% to 11%. It is presumed that many Santa Barbara students who previously would not have owned any vehicle have now become bicycle owners.

F. VEHICLE USE

1. One of the characteristics of a bicycle-oriented campus is that if a student owns a bicycle, there is a good chance he will use it as transportation to campus; but if he owns a car, there is a low probability he will use it as transportation to campus.

As shown in Table 80, 82% of the Santa Barbara bicycle owners used their bicycles for transportation to campus, while only 31% of car owners used their cars. Stated another way, while 7 out of 10 students kept bicycles at Santa Barbara, 6 out of 7 students used their bicycles for transportation to campus. By contrast, 5 out of 10 students kept cars, but on an average fewer than 2 of these 5 students used their cars for transportation to campus.

2. The probability that a student would use the vehicle he or she owned varied considerably depending on the distance the student lived from campus. As shown in Table 80, bicycle use was highest among students

TABLE 80

PROBABILITY OF VEHICLE OWNERS USING THEIR VEHICLES FOR TRANSPORTATION TO CAMPUS

Santa Barbara Campus

1971-72

	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	Total/ Average
Number of Students	2,448	5,263	2,081	734	734	734	245	12,239
Percent who own cars	24%	51%	61%	78%	75%	75%	67%	52%
Percent who drive cars	0%	2%	13%	56%	69%	70%	67%	16%
Probability of car[a] owners driving to campus	0.00	0.04	0.21	0.72	0.92	0.93	1.00	0.31
Percent who own bicycles	82%	80%	76%	51%	32%	30%	21%	71%
Percent who ride bicycles	68%	73%	65%	21%	5%	3%	0%	58%
Probability of bicycle owners riding to campus	0.83	0.91	0.86	0.41	0.16	0.10	0.00	0.82

[a] Estimated based on other campuses. Includes some students who drive cars owned by their families.

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

living within two miles of campus, and remained substantial among students living 3 to 5 miles from campus. Among students living within one mile of the Santa Barbara campus there was a 91% probability they would use the bicycle they owned as transportation to campus; 86% of students living 1 to 2 miles from campus who kept bicycles and 41% of students living 3 to 5 miles from campus who kept bicycles rode them to campus.

3. Car use was lowest among students keeping cars and living within two miles of campus, but increased substantially among students keeping cars and living within three to five miles from campus. Only 4% of the students living within one mile and 21% of students living 1 to 2 miles from campus who kept cars used them as transportation to campus; but, 72% of students living 3 to 5 miles and more than 90% of the students living six or more miles from campus who owned cars used them.

XV. SANTA CRUZ

A. SUMMARY

Santa Cruz is unique among the University of California campuses because it has two dominant modes of transportation rather than one. In 1971-72, close to one-half of the students drove, rode or car pooled to campus, while another one-third used public transportation.

The driving orientation at Santa Cruz has been stimulated by factors which are similar at other auto-oriented campuses--a relatively large percentage of students living at substantial distances from the campus, campus buildings located far apart,and available parking on campus. In addition, the steepness of the environs discourages bicycling or walking. The popularity of public transportation, on the other hand, is due almost entirely to development efforts of the administration and the students, first with a minibus system around the campus, and then with a student subsidy to the city bus system and the addition of a feeder bus line from the city to the campus.

The public transit seems to have drawn its student passengers primarily from students who formerly were car passengers, including hitchhikers, and to a lesser extent from pedestrians. At the same time, the public transit did not reduce the number of car drivers, although the bus system has helped keep the number of cars coming to campus at a constant level. The major impact the buses had was limited by growth in campus enrollment which resulted in students living farther away from the campus, beyond the distances at which public transit has its greatest effect.

With less than thirty percent of the students keeping cars, Santa Cruz students had the lowest car ownership rate of any campus. This rate was less than half of the University-wide average. One reason is due to Santa Cruz being almost entirely an undergraduate campus and thus following the general pattern of other campuses in that students of lower academic class levels are less likely to own cars. However, those Santa Cruz students who did own cars seemed quite immune to the lure of public transit; although less than the heavily-automobile-dominated campuses, Santa Cruz students had a high probability, eighty percent, that a car owner would use his car for transportation to campus. At the same time Santa Cruz also had the highest percentage of students who owned no vehicle at all.

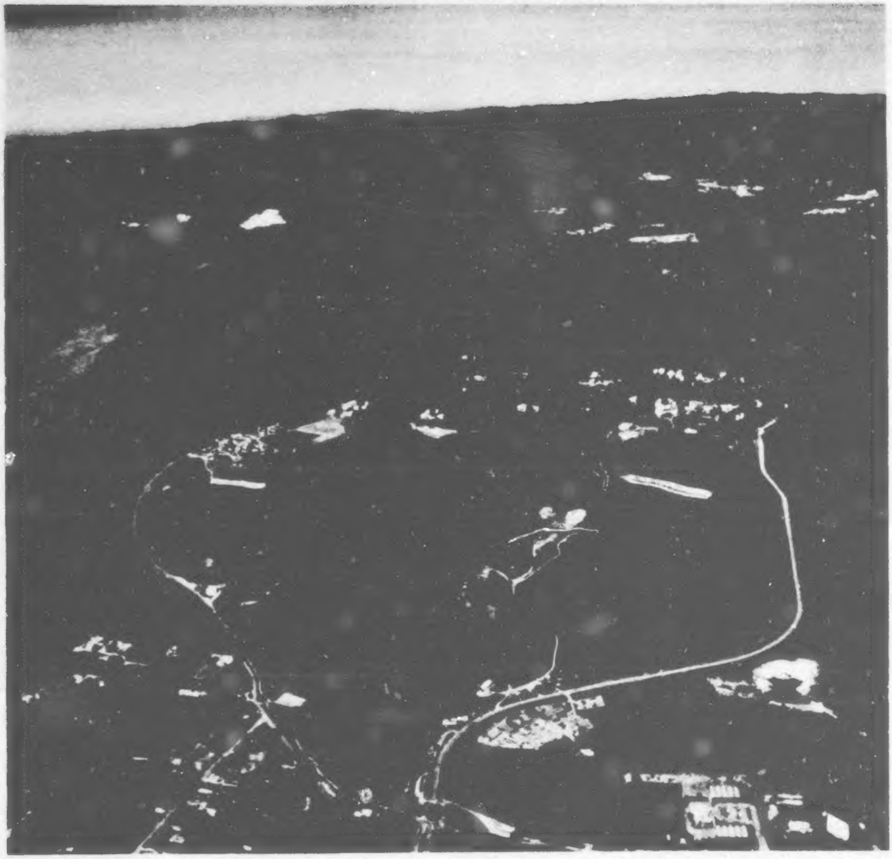
B. BACKGROUND

Santa Cruz, one of the three new campuses of the University of California (Irvine and San Diego are the other two), opened in fall 1966. In 1965-66, Santa Cruz had an enrollment of 638 students. By 1971-72, enrollment had increased to 4,209.

The Santa Cruz campus, imitative of the concept of the English universities of Cambridge and Oxford is built as a series of residential colleges. Each of the separate colleges is built around a central core of campus-wide facilities--the various laboratory and classroom buildings, central services, the library and the performing arts building. The purpose of the residential college concept is to provide students with a combined living/learning environment. To date, as shown in Map 28, six colleges have been built and the seventh is in the construction stage.

PHOTOGRAPH 17

SANTA CRUZ CAMPUS, AERIAL VIEW, 1974

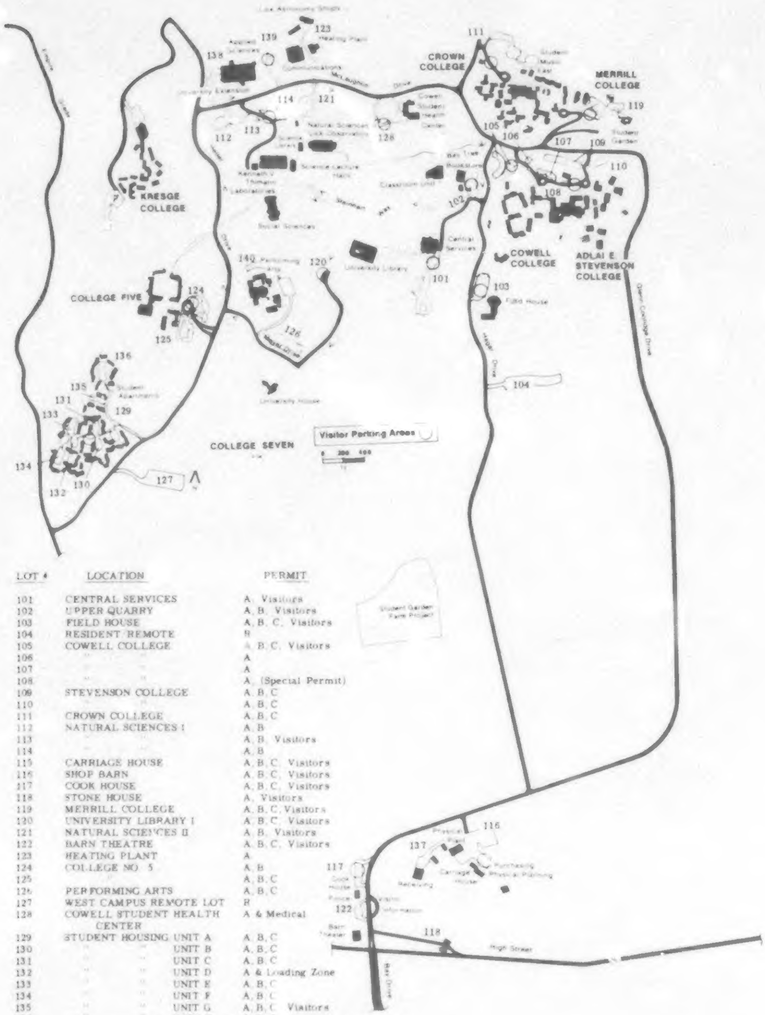


View looking north. Photograph by Pacific Resources, Inc.

MAP 28

SANTA CRUZ CAMPUS

UCSC Parking Plan


Lick Astronomy Shops
123
Heating Plant
139
Applied Sciences
138
Communications
McLaughlin Drive
University Extension
114
121
112
113
Science Library
Natural Sciences
Lick Observatory
128
Kenneth V. Thimann Laboratories
Science Lecture Hall
Classroom Unit
Steinhart Way
Social Sciences
KRESGE COLLEGE
140 Performing Arts
120
University Library
126
COLLEGE FIVE
124
125
136
135
Student Apartments
131
133
129
134
130
132
127
University House
COLLEGE SEVEN
Visitor Parking Areas
111
CROWN COLLEGE
Student Music East
MERRILL COLLEGE
119
Cowell Student Health Center
105
106
107
109
Student Garden
Bay Tree Bookstore
110
102
108
Central Services
101
COWELL COLLEGE
ADLAI E. STEVENSON COLLEGE
103
Field House
Hagar Drive
Glenn Coolidge Drive
104
Student Garden Farm Project
116
Physical Plant
137
Receiving
Carriage House
Purchasing
Physical Planning
117
Cook House
Police
Visitor Information
122
Barn Theater
118
High Street
Bay Drive

LOT #	LOCATION	PERMIT
101	CENTRAL SERVICES	A, Visitors
102	UPPER QUARRY	A, B, Visitors
103	FIELD HOUSE	A, B, C, Visitors
104	RESIDENT REMOTE	R
105	COWELL COLLEGE	A, B, C, Visitors
106	" "	A
107	" "	A
108	" "	A, (Special Permit)
109	STEVENSON COLLEGE	A, B, C
110	" "	A, B, C
111	CROWN COLLEGE	A, B, C
112	NATURAL SCIENCES I	A, B
113	" "	A, B, Visitors
114	" "	A, B
115	CARRIAGE HOUSE	A, B, C, Visitors
116	SHOP BARN	A, B, C, Visitors
117	COOK HOUSE	A, B, C, Visitors
118	STONE HOUSE	A, Visitors
119	MERRILL COLLEGE	A, B, C, Visitors
120	UNIVERSITY LIBRARY I	A, B, C, Visitors
121	NATURAL SCIENCES II	A, B, Visitors
122	BARN THEATRE	A, B, C, Visitors
123	HEATING PLANT	A
124	COLLEGE NO. 5	A, B
125	"	A, B, C
126	PERFORMING ARTS	A, B, C
127	WEST CAMPUS REMOTE LOT	R
128	COWELL STUDENT HEALTH CENTER	A & Medical
129	STUDENT HOUSING UNIT A	A, B, C
130	" " UNIT B	A, B, C
131	" " UNIT C	A, B, C
132	" " UNIT D	A & Loading Zone
133	" " UNIT E	A, B, C
134	" " UNIT F	A, B, C
135	" " UNIT G	A, B, C, Visitors
136	" " UNIT H	A, B, C
137	SHOP BARN	A, Visitor & Special Permit
	RECEIVING BARN	A, Visitor
	GARAGE AREA	University Vehicles Only
138	APPLIED SCIENCES (West)	A
139	APPLIED SCIENCES (East)	Visitor
140	PERFORMING ARTS (North)	A
	GARDEN PROJECT AREA	Visitor

Each college is separated from the others by hills and strands of redwood trees and each possesses a distinct architectural individuality. As illustrated in the campus map, many of the colleges are located a considerable distance from one another--ranging from one-fourth to one mile apart. Arterial roads connect the campus to the City of Santa Cruz and secondary roads connect the six colleges with each other and with the central core of the campus.

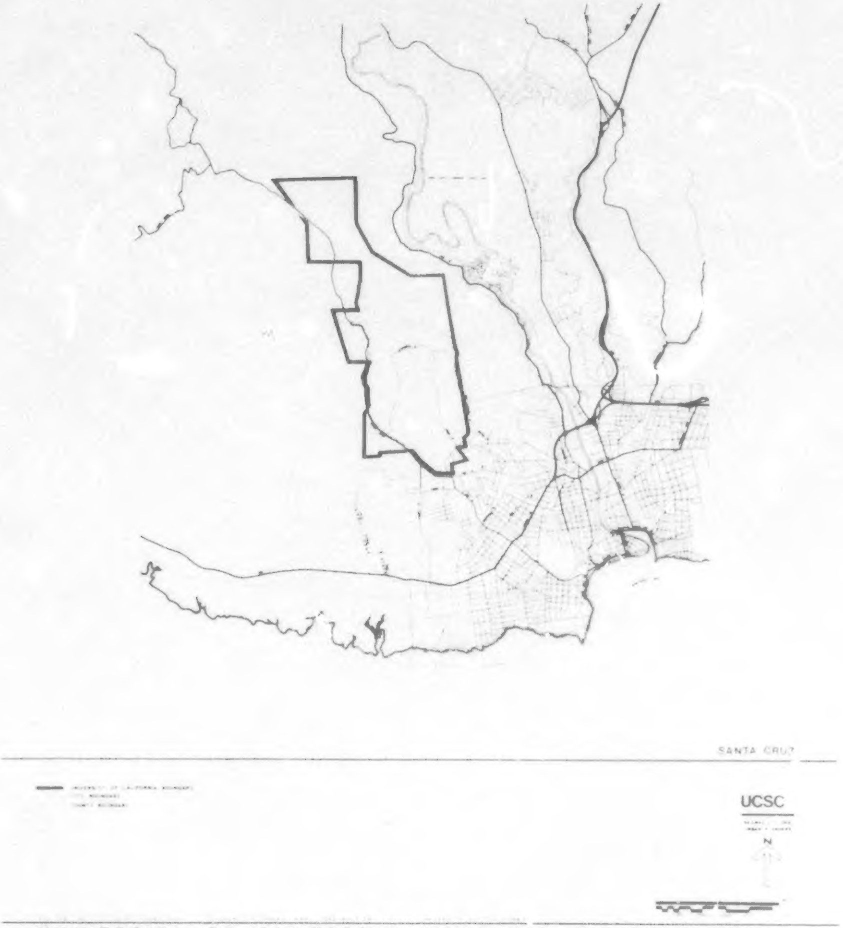
As shown in Map 29, the developed portions of the 2,001-acre Santa Cruz campus are within the City of Santa Cruz, while the remainder of the campus is under Santa Cruz County jurisdiction. The aerial photograph illustrates that virtually all of the campus environs remain in open use, including the 1,737-acre Cowell Redwoods State Park which annually attracts 240,000 visitors but has no direct access to the campus. Large holdings of the Cowell Foundation and other owners surround the campus to the east and west.

The campus environs area has experienced moderate urban growth since enrollment of the first group of students in 1965. A 160-lot subdivision and a small convenience shopping center south of the Bay Street entrance of the campus have been the major additions to preexisting urban development since 1963. An elementary school and a church are located next to the southeast corner of the campus on High Street and further east is a group of churches. The primary area of campus-community interaction is those neighborhoods south of the campus.

One major issue affecting the campus is the severe housing shortage in Santa Cruz, a result of increasing competition by elderly, low-income, and student groups for accommodations and of declining new-housing construction rates. As a result, student residences are scattered throughout the entire county.

MAP 29

SANTA CRUZ CAMPUS ENVIRONS


SANTA CRUZ
UNIVERSITY OF CALIFORNIA BOUNDARY
CITY BOUNDARY
COUNTY BOUNDARY
UCSC
N
UNIVERSITY OF CALIFORNIA CAMPUSES ENVIRONS STUDY

Zoning in the south and southeast sections of the environs is primarily single-family residential. The only commercial and industrial zones are also in these areas. The remainder is a mixture of agricultural, single-family residential and rural residential zones. The lowest residential densities (maximum: under five dwelling units/net acre; single-family residential only) are along the southern and part of the northwestern campus borders and along State Highway 9 in the northeast. With minor exceptions, other residential areas are single-family residential (maximum: under ten du/net acre). Multi-family as well as single-family zones of up to 22 du/net acre may be found in the south section of the environs--rather far, however, from the campus.

The principal commercial zone is along State Highway 1 from Swift Street eastward to the junction with State Highway 17. Only retailing, personal and professional services are permitted in the eastern half of this area, while in the western, other commercial uses are also permitted. A smaller commercial zone south of the campus on High Street permits a range of uses. One large heavy industrial zone is located at the junction of State Highways 1 and 9, and a smaller area is south of State Highway 1.

C. TRANSPORTATION ORIENTATION

Santa Cruz, unlike other campuses in the University, is clearly bimodal in its transportation orientation. All campuses except Santa Cruz have one dominant student travel mode used by a majority of their students; Santa Cruz has two--cars and public transit.

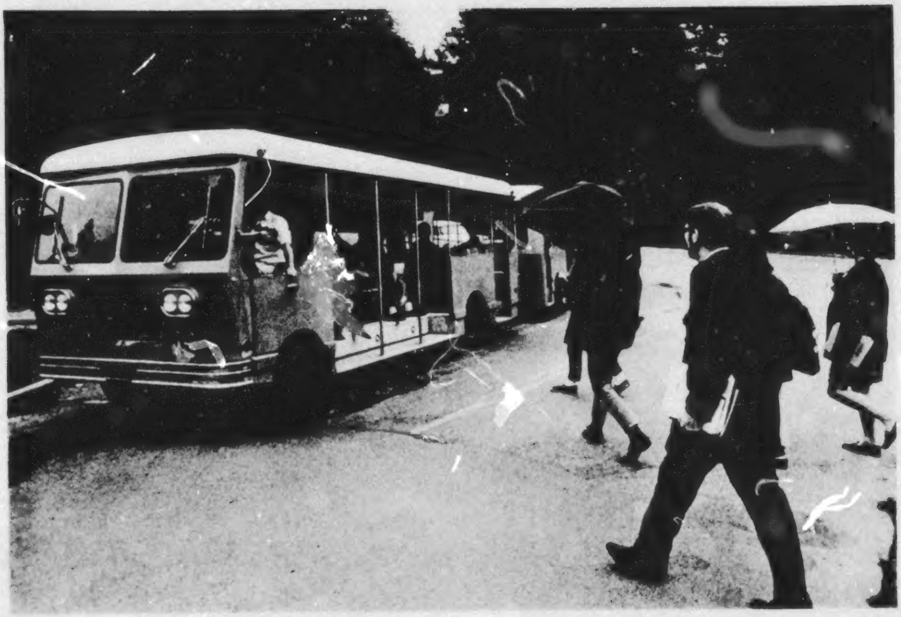
The campus environs conditions which have encouraged the auto-orientation of the Santa Cruz campus are similar to features observed at other campuses with a car orientation: namely (1) a large proportion of students living in housing beyond the immediate campus environs; (2) a steep and hilly campus environs terrain which discourages walking or bicycling; (3) a spread-out campus distant from the city (as shown in the aerial photograph and Map 29), and a lack of intensity of development in the campus environs makes travel by foot or bicycle inconvenient; and, (4) provision of a significant amount of parking for the campus population. These conditions, in 1971-72, encouraged as many as 47% of the student body to travel to campus by car, including 28% of the students who were car drivers, 16% who were car passengers, and 3% who came in car pools.

In contrast to these conditions, which encourage an auto-orientation, the campus' public transit orientation was stimulated by different circumstances. The dominant factor encouraging public transit use at Santa Cruz was a decision on the part of the campus administration to advocate a form of transportation other than the automobile. As a consequence of campus efforts, in 1971-72, 36% of Santa Cruz students used public transportation for travel to campus.

Several years of considerable effort were involved in initiating this public transit system. To improve transportation on the campus itself, in 1968-69 the campus instituted a minibus system, as shown in the photos. The minibus circled the campus and provided students with transportation from class to class. By 1969-70, it became obvious to campus administrators that a more comprehensive approach to campus transportation problems was necessary. The campus officials met with City of Santa Cruz administrators and agreed that it would be feasible to expand the city bus system to serve the campus. In 1970, students, eager to experiment with the public transit

PHOTOGRAPH 18

SANTA CRUZ CAMPUS, CAMPUS MINI-BUS



City bus along Glenn Coolidge Drive.

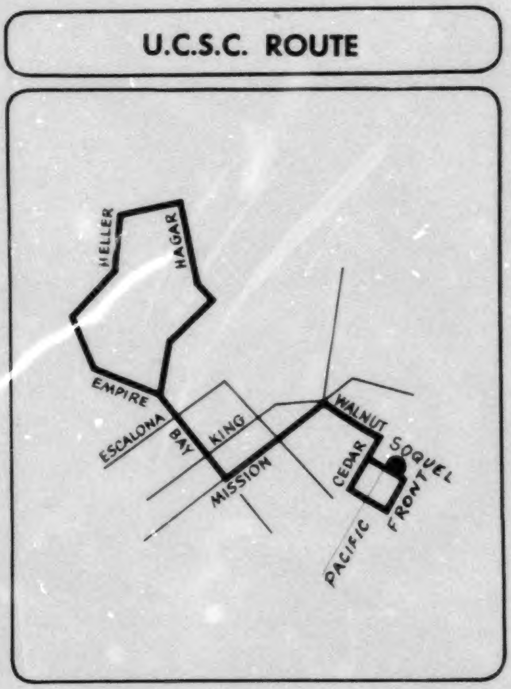
PHOTOGRAPH 19

SANTA CRUZ CAMPUS, SANTA CRUZ

METROPOLITAN TRANSIT DISTRICT BUS

MAP 30

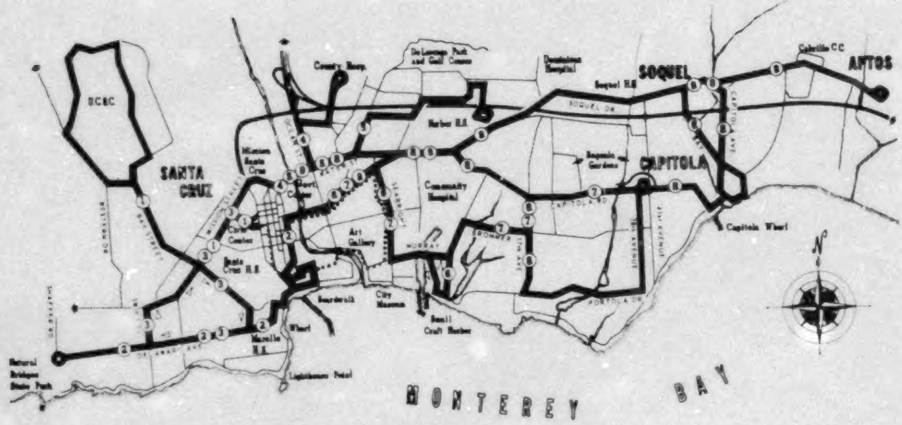
SANTA CRUZ CAMPUS BUS ROUTE


U.C.S.C. ROUTE
HELLER
HAGAR
EMPIRE
ESCALONA
BAY
KING
MISSION
WALNUT
SOQUEL
CEDAR
FRONT
PACIFIC

MAP 31

SANTA CRUZ METROPOLITAN TRANSIT

DISTRICT ROUTE


UCSC
SANTA CRUZ
Mission Santa Cruz
County Hosp.
DeLaveaga Park and Golf Course
Dominican Hospital
Soquel H.S.
SOQUEL
Cabrillo CC
APTOS
SOQUEL DR
Harbor H.S.
OCEAN ST
CAPITOLA AVE
CAPITOLA
CAPITOLA RD
Community Hospital
Civic Center
Santa Cruz H.S.
Art Gallery
MURRAY
BROMMER
17th AVE
30th AVENUE
41st AVENUE
PORTOLA DR
Capitola Wharf
Boardwalk
City Museum
Small Craft Harbor
Wharf
Natural Bridges State Park
Lighthouse Point
DELAWARE AVE
BAY STREET
MISSION STREET
MONTEREY BAY
N

proposal, voted to assess themselves $3.50/quarter or $10.50/year to subsidize the city bus system. This subsidy allowed the students to ride the city bus system free upon showing proper student identification. The Santa Cruz metropolitan Transit District provides bus service to campus every 90 minutes (see Maps 30 and 31).

D. TRANSPORTATION MODES

1. The mean (average) distance of all student residences from campus is 3.29 miles, while the modal distance is within one mile.

As shown in Tables 82 and 83, in 1971-72, 1,936 students (48% of the enrollment of 4,209) lived on-campus; 295 (7%) lived within one mile of campus; 379 (9%) lived within 1 to 2 miles; 842 (20%) lived within 3 to 5 miles; and 757 (18%) lived six or more miles from campus.

2. Public transit was the mode of transit preferred by 36% of Santa Cruz students as a direct result of actions by the city, campus, and students, beginning in September 1970, to run a Santa Cruz Metropolitan Transit District bus connecting the campus with the City of Santa Cruz.

As illustrated in Tables 81, 82 and 83, in 1971-72 slightly less than four out of ten Santa Cruz students used public transit to travel to and from campus, five out of ten students used automobiles (28% were car drivers, 16% were car passengers, and 3% were in car pools), one out of ten walked, and the remainder bicycled or used motor scooters or motorcycles.

3. Public transit and cars are both popular among students living within five miles, while the car dominates travel patterns for students living six or more miles from campus. This is detailed in Tables 81 and 82.

4. The effect of the new transit plan on student travel modes was substantial. As illustrated in Table 83, after the bus line went into operation, the most significant change in travel patterns at Santa Cruz was a six-fold increase in the percentage of students riding public transportation (from 6% in 1969, to 36% in 1971), and a 16% decrease in the percentage of students who were car passengers (from 34% in 1969, to 18% in 1971).

5. The most significant change in student travel patterns at Santa Cruz since the inception of the public transit system has been the shift in student travel modes from hitchhiking or arriving on campus as a car passenger to the use of public transit.

Table 83 shows the decrease from 1969-70 to 1971-72 in percentage of students who were car drivers (by 4%) or were in car pools (by 2%); who traveled by motorcycles or motor scooters (1%); or, who walked to campus (8%). These decreases, however, have not been as dramatic as the 16% decrease in students who came to campus as car passengers; some of these 358 car passengers were also formerly hitchhikers.

6. The impact of the bus system on reducing the total number of students driving cars to campus, while noteworthy, has been somewhat limited. In 1969-70, 989 (32%) drove cars, in 1971-72, 1,150 (28%) drove cars. There are two reasons for this relatively stable auto use: first, absolute enrollment increases (from 3,092 to 4,209 students) partially cancelled out the magnitude of the measured decrease in the percentage of students driving to campus; second, the large increase in the number and percent of students living off campus, from 1,206 (39%) in 1969-70 to 2,273 (55%) in 1971-72, resulted in considerably more off-campus students driving to campus.

TABLE 81

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Santa Cruz Campus

1971-72

	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								
TRANSPORTATION MODE	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	1,936	295	379	842	421	168	168	4,209	3.29
Car Driver	310	47	79	236	236	116	124	1,148	6.59
Car Passenger	310	53	87	160	38	23	24	695	7.45
Car Pool	39	6	8	17	29	10	12	121	6.12
Motor Scooter or Cycle	19	6	4	8	8	2	2	49	3.69
Bicycle	58	9	26	42	13	2	0	150	2.58
Public Transportation	794	121	133	362	97	15	6	1,528	1.87
Walk	406	53	42	17	0	0	0	518	.31
Hitchhike	0	0	0	0	0	0	0	0	-
TOTAL	1,936	295	379	842	421	168	168	4,209	3.29

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 82

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Santa Cruz Campus

1971-72

TRANSPORTATION MODE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS								Mean Distance (miles)
	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	
Number of Students	1,936	295	379	842	421	168	168	4,209	3.29
Car Driver	16%	16%	21%	28%	56%	69%	74%	28%	6.59
Car Passenger	16	18	23	19	9	14	14	16	7.45
Car Pool	2	2	2	2	7	6	7	3	6.12
Motor Scooter or Cycle	1	2	1	1	2	1	1	1	3.69
Bicycle	3	3	7	5	3	1	0	4	2.58
Public Transportation	41	41	35	43	23	9	4	36	1.87
Walk	21	18	11	2	0	0	0	12	0.31
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	3.29 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 83

STUDENT TRANSPORTATION MODES MOST OFTEN USED TO OR FROM CAMPUS

Santa Cruz Campus

1965-66, 1967-68, 1969-70, and 1971-72

TRANSPORTATION MODE	1965-66		1967-68		1969-70		1971-72	
	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students	638	100%	1,911	100%	3,092	100%	4,209	100%
Car Driver	198	31%	593	31%	989	32%	1,150	28%
Car Passenger	153	24	478	25	1,051	34	693	16
Car Pool	26	4	38	2	155	5	121	3
Motor Scooter or Cycle	32	5	57	3	62	2	49	1
Bicycle	45	7	19	1	31	1	150	4
Public Transportation	76	12[a]	382	20[a]	186	6[a]	1,528	36[b]
Walk	108	17	344	18	618	20	518	12
TOTAL	638	100%	1,911	100%	3,092	100%	4,209	100%

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

[a] These data indicate use of an on-campus "elephant-train" mini-bus system.

[b] These data indicate use of the City of Santa Cruz municipal bus system to campus and the campus mini-bus system.

7. The results of the Santa Cruz efforts show that the number of cars coming to campus can be reduced by increasing the number of students living on-campus, and by providing an alternative means of transportation.

With the addition of the public transit, the increase in the percent of students living off-campus from 39% in 1969-70 to 55% in 1971-72 has meant only an additional 160 cars coming to campus. Had the pre-transit travel distribution continued, the increase would have been closer to 300 additional cars on-campus; thus, 140 fewer cars came to campus than would have, had the transit not been operating.

Table 84

PERCENT OF STUDENTS USING PUBLIC TRANSPORTATION OR DRIVING
BY DISTANCE OF STUDENT RESIDENCE FROM THE SANTA CRUZ CAMPUS

Santa Cruz Campus
1971-72

Distance of Student Residence from Campus	Number of Students	Number of Students Using Public Transport.	Percent of Students Using Public Transport.	Number of Students Driving to Campus	Percent of Students Driving to Campus
On campus	1,936	794	41%	310	16%
0-1 mile	295	121	41	47	16
1-2 miles	379	133	35	79	21
3-5 miles	842	362	43	236	28
6-10 miles	421	97	23	236	56
11-20 miles	168	15	9	116	69
20 + miles	168	6	9	124	74
Total/Average All Distances	4,209	1,528	36%	1,148	28%

The previous table illustrates that if the trend to live considerable distances (6 or more miles) from the campus continues, and enrollments increase, the number of cars driven to campus will also increase. Similarly, if the on-campus or near-campus (5 miles or less) population increases, the number and percentage of students using public transportation should also increase.

E. VEHICLE OWNERSHIP

1. Santa Cruz students have consistently displayed vehicle ownership patterns which are quite different than those at the other campuses. First, in 1971-72, car ownership rates at Santa Cruz were the lowest of any campus; second, a higher percentage of Santa Cruz students did not own either a car or a bicycle; and third, dual (car/bicycle) ownership rates were the lowest of any campus.

2. Between the opening of the campus in 1965-66 and through 1971-72, only about one in three Santa Cruz students brought a car to campus. As shown in Tables 85, 86, and 87, in 1965-66, 27% of the students kept a car; in both 1969-70 and 1971-72, 35% of students did. This compares to a nine-campus average car ownership rate of 58% in 1971-72, with a high of 74% at Irvine.

3. Consistent with experiences at other campuses, bicycle ownership at Santa Cruz increased considerably between 1969-70 and 1971-72. The percent of bicycle owners increased from 16% to 28% and the number of bike owners increased from 495 to 1,193.

4. During the last four years surveyed, about one-half of the Santa Cruz students did not keep a vehicle at all. In 1967-68, 53% of Santa Cruz students had no vehicle; in 1971-72, 45% had none. By comparison, the University-wide average was 24%.

Finally, in 1971-72, only 10% of the students at Santa Cruz kept both a car and a bicycle. This compared to a nine-campus average of 23%.

5. One reason for the low vehicle ownership rates is the dominant undergraduate academic class standing of Santa Cruz students. As shown in Table 64, in 1971-72, 95% of the Santa Cruz enrollment was undergraduate, divided almost evenly between lower-division and upper-division students. While lower-division students do not generally keep cars (only 37% of all University of California lower-division students had a car in 1971-72), at Santa Cruz only 20% of lower-division students had cars. The 1971-72 car ownership rates were likewise lower for other Santa Cruz students: 42% for upper-division students and 61% for graduate students, compared to 60% and 78% for all University upper-division and graduate students respectively.

6. Car ownership rates increased as students lived farther from campus. As noted in Table 86, 60% of those living 6 to 10 miles from campus kept cars, as did 72% of the students living 11 to 20 miles, and 74% of students living more than 20 miles. This reflects the fact that bus service is not generally available beyond six miles from campus.

7. Despite these car ownership rates, which were not too different from University-wide averages, the percentage of Santa Cruz students who did not keep any vehicles, regardless of the distance of their residence from campus, was nearly double that of all University campuses. For example,

TABLE 85

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Santa Cruz Campus

1971-72

VEHICLE	DISTANCE OF STUDENT RESIDENCE FROM CAMPUS On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	1,936	295	379	842	421	168	168	4,209	3.29
Car	445	65	140	345	253	121	124	1,493	4.67
Motor Scooter or Cycle	19	6	8	25	8	2	2	70	4.48
Bicycle	562	100	136	270	93	18	14	1,193	2.73
None	1,007	145	144	337	139	51	52	1,875	3.25
TOTAL	2,033	316	428	977	493	192	192	4,631	
(Keep Both Car and Bicycle)	97	21	49	135	72	24	24	422	5.06

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 86

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY DISTANCE OF STUDENT RESIDENCE FROM CAMPUS

Santa Cruz Campus

1971-72

VEHICLE	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	TOTAL	Mean Distance (miles)
Number of Students	1,936	295	379	842	421	168	168	4,209	3.29
Car	23%	22%	37%	41%	60%	72%	74%	35%	4.67
Motor Scooter or Cycle	1	2	2	3	2	1	1	2	4.48
Bicycle	29	34	36	32	22	11	8	28	2.73
None	52	49	38	40	33	30	31	45	3.25
TOTAL	105%	107%	113%	116%	117%	114%	114%	110%	
(Keep Both Car and Bicycle)	(5%)	(7%)	(13%)	(16%)	(17%)	(14%)	(14%)	(10%)	5.06 miles

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, 1971-72.

TABLE 87

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE

Santa Cruz Campus

1965-66, 1967-68, 1969-70, and 1971-72

	1965-66		1967-68		1969-70		1971-72	
VEHICLE	Students	Percent	Students	Percent	Students	Percent	Students	Percent
Number of Students	638	100%	1,911	100%	3,092	100%	4,209	100%
Car	172	27%	554	29%	1,082	35%	1,493	35%
Motor Scooter or Cycle	32	5	57	3	62	2	70	2
Bicycle	300	47	363	19	495	16	1,193	28
None	204	32	1,013	53	1,608	52	1,875	45
TOTAL	708	111%	1,987	104%	3,247	105%	4,631	110%
(Keep Both Car and Bicycle)	(70)	(11%)	(76)	(4%)	(155)	(5%)	(422)	(10%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Survey, years indicated.

in 1971-72, 52% of Santa Cruz students living on campus had no vehicle, compared to 35% University-wide, similarly 49% of Santa Cruz students living within one mile of campus had no cars, compared to 26% of all University of California students.

Part of the cause of the lower car ownership at Santa Cruz can be gleaned from data taken from a 1966 economic impact study of Berkeley and Santa Cruz.[1] On average, a student's non-housing expenditures at Berkeley were double those of Santa Cruz students ($2,910 to $1,140). The differences of the urban metropolitan setting of Berkeley vs. the suburban location of Santa Cruz meant fewer opportunities for shopping, entertainment, and recreation which would require a car.

F. VEHICLE USE

1. Although a functional public transit system had been developed to serve the Santa Cruz campus, most students who owned cars did not use public transit but instead used their cars to travel to campus. (This phenomenon has also been observed at each of the other automobile-oriented campuses.) As shown in Table 89, for every 100 students at Santa Cruz, only 35 owned cars, but as many as 28 of them were used daily for transportation to campus; this resulted in an 80% probability of car use by car owners, a figure exceeded only by the two completely automobile-oriented campuses-- Irvine (89%) and San Diego (85%).

2. In a complementary manner, students who used public transportation to get to campus did not own cars. The number of transit passengers and

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[1] The Community Impact of the University of California's Berkeley and Santa Cruz Campuses. A staff report by Ira Stephen Fink. (Berkeley: University of California, Office of the President, 1967.)

TABLE 88

STUDENT VEHICLES KEPT AT STUDENT RESIDENCE BY CLASS STANDING, BY MARITAL STATUS AND BY SEX

Santa Cruz Campus

1971-72

VEHICLE	CLASS STANDING			MARITAL STATUS		SEX		ALL STUDENTS
	L. D.	U. D.	Grad.	Single	Married	Male	Female	
Number of Students	1,894	2,020	295	3,784	425	2,231	1,978	4,209
Car	20%	42%	61%	30%	67%	39%	26%	35%
Motor Scooter or Cycle	1	2	3	2	4	3	1	2
Bicycle	32	28	24	30	26	29	30	28
None	52	43	33	47	31	41	52	45
TOTAL	105%	115%	121%	109%	128%	112%	109%	110%
(Keep Both Car and Bicycle)	(5%)	(15%)	(21%)	(9%)	(28%)	(12%)	(9%)	(10%)

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

TABLE 89

PROBABILITY OF VEHICLE OWNERS USING THEIR VEHICLES FOR TRANSPORTATION TO CAMPUS

Santa Cruz Campus

1971-72

	On-Campus	Within 1 mile	1-2 miles	3-5 miles	6-10 miles	11-20 miles	20 + miles	Total/ Average
Number of Students	1,936	295	379	842	421	168	168	4,209
Percent who own cars	23%	22%	37%	41%	60%	72%	74%	35%
Percent who drive cars	16%	16%	21%	28%	56%	69%	74%	28%
Probability of car owners driving to campus	0.70	0.73	0.57	0.68	0.93	0.96	1.00	0.80
Percent who own bicycles	29%	34%	36%	32%	22%	11%	8%	28%
Percent who ride bicycles	3%	3%	7%	5%	3%	1%	0%	4%
Probability of bicycle owners riding to campus	0.10	0.09	0.19	0.16	0.14	0.09	0.00	0.14

[a] Estimated based on other campuses. Includes some students who drive cars owned by their families.

Source: University of California, Office of the Assistant Vice President--Physical Planning, Student Housing and Transportation Surveys, 1971-72.

car drivers exceeded the number of car owners, suggesting that if the Santa Cruz campus wanted drastically to reduce the number of students driving cars to campus and increase the number of students using public transportation, it would be useful to limit the number of students who have cars at campus.

3. To the extent that public transit will reduce the need for a student to have a car, one might expect car use at Santa Cruz to be kept moderate, however, it would appear from the data in this study that because transit appeals most to off-campus students who do not have cars and who would otherwise hitchhike, walk, or arrive on campus as a car passenger, cars are still needed at Santa Cruz. Thus, to the degree that a Santa Cruz student needs to get to employment, recreation, shopping and entertainment which is not served by transit, he would probably travel by car. Likewise, if the campus develops more graduate programs, the probability of increased car ownership and car use would be quite noticeable at Santa Cruz.

APPENDIX A: SELECTED AND ANNOTATED RECOMMENDATIONS FROM THE STUDY, BALANCED TRANSPORTATION PLANNING FOR SUBURBAN AND ACADEMIC COMMUNITIES[1]

I. GENERAL RECOMMENDATIONS FOR CITIES AND INSTITUTIONS

A. AUTOMOBILE USAGE

1. Employers, colleges and school districts should consider imposing vehicle registration charges for employees and students instead of absorbing the cost of parking themselves.

2. Determined efforts should be made all by institutions - including retailers - to ensure that employees, students, visitors and customers are fully informed as to all alternative modes of travel to autos for reaching their respective locations. A coordinated approach in cooperation with local Chambers of Commerce should also be considered.

3. Zoning ordinances in the City Municipal Codes relating to provision of parking spaces should be made more flexibile and provide institutions with an incentive to encourage alternate forms of travel to single-rider auto usage.

4. Employers and colleges should take the initiative in encouraging formation of car pools and instituion of charter bus services, being prepared to combine forces with other closely located institutions to provide a larger base of operations.

B. PUBLIC TRANSIT

1. Cities, in cooperation with local Chambers of Commerce, should develop public awareness of local transit services as community assets, and seek the assistance of retailers, employers, schools and colleges in stimulating patronage.

2. Distinctive new bus stop signs should be designed with a view to making them more conspicuous--especially for pedestrians. Consideration should also be given to affixing route and schedule information to a majority of stops, notably those likely to attract casual patronage.

3. Consideration should be given to variations in the routing structure of buses at different times of day, in order to better meet traveler needs.

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[1] Balanced Transportation Planning for Suburban and Academic Communities: A Case Study of the Midpeninsula Region of the San Francisco Bay Area. Final Report of the Stanford (University) Workshop on Transportation Planning. Edited by Christopher H. Lovelock. Stanford, California: Stanford Workshops on Political and Social Issues (SWOPSI), 590A Old Union, Revised December 1971, pp. 4.16-4.28.

4. An evaluation should be undertaken of instituting a "grid" type route network for buses, using direct north-south and east-west routes in places of present loops and diversions.

5. Transit lines should be encouraged to experiment with promotional fare schemes designed to boost patronage on the buses during off-peak hours.

6. Institutions having employees or students known to commute significant distances to work should take the initiative in encouraging and facilitating formation of commuter bus charters.

7. Visitor maps to the area, showing transit routes and points of interest, should be displayed at transit terminals and other key locations in the city.

8. Schedules and maps should indicate interchange points with other transit services.

9. Consideration should be given to the feasibility of arranging reduced rate transfers between the services of various transit companies.

C. BICYCLING

1. Local city ordinances should be amended to require provision of bicycle parking facilities in the vicinity of all offices, stores, banks, theaters, and other institutions generating more than a defined minimum level of employee or visitor traffic.

2. Consideration should be given by local cities and institutions to provision of bicycle lock-up facilities in the vicinity of transportation terminals and other publically accessible locations where bicycles may be parked all day (or night). Such facilities should be designed to protect the entire bicycle from theft and weather, and might be financed by a user rental charge.

3. Local police forces should cooperate to draw up and publish guidelines for bicycle lock quality standards, and encourage retail outlets in the area to stock only those locks which meet these minimum standards.

4. Periodic publicity campaigns should be undertaken by local police forces and institutions to persuade bicycle owners to take elementary security precautions to prevent theft of their bikes.

5. Consideration should be given to instituting and enforcing (a) compulsory bicycle registration in all local police jurisdictions, and (b) a regulation that no retail store might purchase a second hand bicycle for resale unless its owner could produce proof of ownership.

6. City and County traffic departments should clearly identify bicycle crossings, with warning street markings or notices for both car-drivers, pedestrians and bicyclists.

7. Occasional publicity campaigns should be undertaken at both the city and institutional (i.e., school, college, employer) level to encourage safer bicycling habits.

D. LAND DEVELOPMENT AND TRAFFIC DEMANDS

1. In evaluating campus use alternatives, detailed studies should be made of the ability of various forms of mass transit services to reduce automobile usage and congestion (and thereby the need for new and/or enlarged highways) resulting from new developments.

2. The campus should initiate studies to determine the environmental impact of possible new highway and parking lot construction on campus lands.

3. Before any further commercial or residential land development is permitted in the campus environs, a careful analysis should be made of both its short and long-term economic consequences for all segments of the community.

4. Studies should be initiated, with campus participation at both city and regional levels, to ascertain the potential that staggering working hours has for reducing peak traffic demands.

II. SPECIFIC RECOMMENDATIONS FOR UNIVERSITIES

A. REGISTRATION AND PARKING FEES

1. All free parking on campus should be eliminated except for handicapped drivers and emergency vehicles, and a compulsory annual car registration fee should be levied on all students, faculty and staff wishing to park their vehicles on campus.

2. Motorcycle registration fees should be set at twenty-five percent of the car registration fee, rounded down to the nearest dollar.

3. The campus should be sensitive to the possibility of individual hardship resulting from imposition of vehicle registration fees in that it may be appropriate to consider offsetting salary increases for staff members in the lowest salary brackets.

B. ROADS AND PARKING LOTS

1. A moratorium should be declared on all further parking lot construction on campus, in order that the alternatives may be thoroughly evaluated.

C. ENCOURAGEMENT OR ALTERNATIVES TO CARS

1. The campus should draw up a policy/plan for reducing the ratio of commuting cars to faculty, staff and students on the main campus by fifty percent over the next five years, and initiate whatever studies are necessary to help achieve this goal.

2. All resident students registering a car should be provided with assigned parking spaces by their residences. However, residents wishing to park elswhere on campus should be required to buy a second sticker or pay visitors' fee.

3. To reduce the number of cars coming on campus, the campus should make vigorous efforts to encourage car pooling by faculty, staff and students. For maximum effectiveness, matching rides and riders should be done at both department and campus-wide levels.

4. Reserved, preferential locations should be provided for registered car pools. Each car pool would pay the price of one car registration for use of a designated space, but more than one sticker would be issued in the event that members of the pool possessed several cars and wished to rotate use of them.

5. Close-in parking locations should be provided for motorcycles and for the handicapped.

6. The campus should carefully monitor all changes initiated to evaluate their impact and to see whether they are having the desired effect. (A flexibile approach allowing for modifications to policy will enhance the likelihood of success.)

D. PUBLIC TRANSIT

1. The campus should erect large, eye-catching signs to identify all transit bus stops on the campus. These signs should carry route and departure information, and plans for their construction should be initiated as soon as possible.

2. The campus should erect weather-proof bulletin boards and display on them the schedule of all public transport companies serving the campus.

3. The campus should agree to initiate and initially to subsidize new charter bus services from neighboring communities, if campus commuters express interest in the service.

4. The campus should create a transportation office, which will be financed by vehicle registration fees and parking fines, and which will publicize and arrange chartered buses and car pools for present and prospective campus commuters.

5. The campus should arrange for the sale, on campus, of the tickets, tokens, and passes of the public transport companies in the campus area. The proposed transportation office could prove this convenience.

6. The campus should give increased emphasis to a study of intracampus transit networks and monitor developments at other colleges and universities.

7. The campus should take steps to ensure that all newcomers--faculty, staff and students--are fully informed as to the availability of public transit and regular charter services to the campus and its environs.

E. BICYCLE-PEDESTRIAN FACILITIES

1. The campus should actively study other possibilities for nre recreational bike and pedestrian paths on campus in conjunction with interested members of the campus community and representatives of local city and recreational organizations.

2. After consultation with all relevant interest groups, the campus planning office should draw up a master plan for bicycle and pedestrian paths on campus land.

3. New bicycle paths should be constructed to high standards, on proper foundations, even if this means a slower program of path construction that would be the case with less expensive paths.

4. Weather-protected, individual bicycle lock-up facilities should be installed at all dorms and made available at modest quarterly rental charges.

5. A survey should be conducted among bicycle commuters (faculty, staff and students) to see if there is a demand for such facilities from non-resident bicyclists too.

6. To facilitate return of lost or stolen bicycles, consideration should be given to compulsory, one-time registration of all bicycles on campus and also to the question of what level of fee should be charged for this.

F. SAFETY, SECURITY AND ENFORCEMENT

1. Traffic enforcement officers should enforce legal standards relating to vehicle noise and pollution control, with a view to preventing violations which impair the quality of life on the campus.

2. Periodic safety campaigns should be initiated on campus, aimed at improving driving manners and observance of highway regulations as well as encouraging correct parking procedures and maintenance of vehicles in good order. Particular attention should be devoted to motorcycles and enouragement given to wearing of protective headgear.

3. To imporve identification and elimination of traffic danger spots, the campus police department should complement its present accident file index with a large wall map on which points at which accidents have occurred would be marked by color-coded pins.

4. Signs should be posted at all points on campus where a bicycle-pedestrian path crosses a road, warning motorists to look both ways for bicyclists and walkers. (Signs are also needed to warn bicyclists and pedestrians to watch for cars.)

5. Periodic safety campaigns should be launched directed at bicyclists. They should be encouraged to use bicycle paths rather than roadways wherever possible, observe standard highway regulations when bicycling on streets, use front and rear lights after dark and maintain their bikes in good order.

6. To help curtail campus robberies, consideration should be given to overnight and weekend closure of certain side streets and service roads in the vicinity of the dorms and other theft-prone buildings.

G. RELATIONS WITH OUTSIDE AGENCIES

1. The campus planning office should work closely with adjacent cities and other public agencies to develop a regional bike route system.

2. The campus should negotiate with the city to conduct an experiment whereby in exchange for a small lump-sum payment by the campus, students, faculty and staff would be permitted to use bus service at a reduced rate.

3. The campus should establish contacts with outside transportation committees to ensure that the needs of the campus are satisfactorily met by any future extension of public transit services.

4. The campus should study any new proposals for establishment of a mass transit district to be able to express publically a position on such proposals.

5. The campus should actively encourage those departments and graduate schools with expertise relevant to the field of transportation planning to work closely with local county and city agencies toward solution of the area's transportation problems.

APPENDIX B: UNIVERSITY OF WASHINGTON TRANSPORTATION POLICY[1]

RESOLUTION

WHEREAS, the Board of Regents recognizes that the University of Washington generates substantial commuter, business, service, tourist, and visitor traffic and that the University therefore has a responsibility to participate with the City of Seattle, the communities surrounding the campus, and other governmental agencies in the development of both short- and long-range transportation plans, and

WHEREAS, the President appointed an ad hoc Committee on Transportation Policy in September, 1972, pursuant to a Board of Regents resolution of August 18, 1972, to develop a recommended transportation policy, and

WHEREAS, the committee after receiving input from throughout the community has submitted its report to the President and the Board has considered the committee's report and the recommendations of the President.

THEREFORE, BE IT RESOLVED, that the Board of Regents (1) accepts the report of the ad hoc Committee on Transportation Policy dated May 14, 1973, and commends that committee for its major contribution to University planning, (2) approves in principle the goals and policies set forth on pages 4 through 10 of the report and (3) in order to begin implementation at an early date, requests the staff to prepare specific recommendations for Board consideration based on the following guidelines relating to University transportation policy:

1. Transportation priorities from most to least desirable are (1) walking, (2) bicycle, (3) bus, (4) car pool, (5) car with driver only, and (6) motorcycle.

2. The University's operating and planning staff should give a high priority to transportation considerations in assessing the environmental impact of new facilities and of the use of facilities in connection with new academic programs.

3. In order to minimize the need for intracampus use of private vehicles, efficient systems should be developed for the movement of people and the delivery of goods and services.

4. University staff should cooperate with local governmental agencies, surrounding communities and representatives of student, faculty and staff interests in developing air quality information and improved transportation plans and programs to lessen the impact of motor vehicles on the University area and its environment.

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[1] Excerpt from University of Washington Board of Regents' Minutes of September 28, 1973.

5. The number of parking spaces for commuters and visitors should not be increased, these parking spaces should be consolidated to minimize the total land utilized for parking, and as alternative means of transportation and financial feasibility including parking revenues permit, the total number of parking spaces should reduced.

6. To improve the aesthetic quality of the campus, all feasible methods should be pursued to eliminate or minimize surface parking from the campus.

7. The University should not operate transportation systems outside the campus, except for service transportation needed for the achievement of the University's principal missions.

8. The University should encourage and assist where necessary the development of practical alternative and innovative means of transportation for commuting students, faculty, staff, and visitors.

9. Any parking fee schedule adopted shall take into consideration special uses of parking facilities (i.e., car pools, needs of the handicapped), the type of facility, and the costs of providing parking facilities, and shall be consistent with the foregoing guidelines.

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